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FOOD TECHNOLOGY ABSTRACTS

Vol.22 No.1
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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm, cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet

g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/ pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal, kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg, ml, mm)
m-equiv	milli-equivalent
m	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano- (10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc. normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)

rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp., spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-(as in µg, µm)
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for al
elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

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(*World Poult. Sci. J.*)

Zeitschrift Fuer Lebensmittel-Untersch
und Forschung (German)
(*Z. Lebensmittel-Unters. Forsch.*)

GENERAL

1 BALASCIO (JR). Food service product development problems encountered by the food scientist. **Food Technol. 40**(7); 1986; 114-9

Product development process is explained along with the problems encountered. Aspects covered include development of the process, operators test, market test and implementation. KAR

2 BURCH (NL) and SAWYER (CA). Hospital foodservice requirements: Special diet convenience foods. **Food Technol. 40**(7); 1986; 131-6

FOOD PROCESSING AND PACKAGING

Processing

3 MARTY (C) and BERSET (C). Degradation of **trans**-β-carotene during heating in sealed glass tubes and extrusion cooking. **J. Food Sci. 51**(3); 1986; 698-702

Four compounds which have been previously reported as products of enzymatic and chemical oxidation reactions were isolated and identified for the first time from the epoxide fraction formed by heating all **trans**-β-carotene. A HPLC method allowing a quick separation and identification of these epoxides was developed. Extrusion cooking at 180 C was a more drastic treatment for the pigment than simple heating for a long period (2 h) at the same temp. AA

Packaging

4 TANDON (S) and BHOWMIK (SR). Evaluation of thermal processing of retortable pouches filled with conduction heated foods considering their actual shapes. **J. Food Sci. 51**(3); 1986; 709-14

5 NOH (BS), HEIL (JR) and PATINO (H). Heat transfer study on flame pasteurization of liquids in aluminium cans. **J. Food Sci. 51**(3); 1986; 715-9

Heat transfer studies were performed in 209 x 413 aluminium cans using 1% bentonite suspension. The cans were heated in a pilot flame sterilizer. The temp. profile was practically uniform radially and axially after 4.5 min. of heating. The slowest heating was experienced in the bottom (heel) of these cans. The temp. difference between the slowest heating point and the hot region over the flame decreased as the can was heated: from 15.6 C after 1 min. to 6.7 C after 4.5 minute of heating. The internal heat transfer coeff. at 40 rpm was measured and showed an increase with heating time. AA

FOOD ENGINEERING AND EQUIPMENT

6 HONG (YC), BAKSHI (AS) and LABUZA (TP). Finite element modeling of moisture transfer during storage of mixed multicomponent dried foods. **J. Food Sci. 51**(3); 1986; 554-8

A finite element model is described that can be used for predicting moisture transfer in mixed food products during storage. Two of three components (raisins, roasted peanuts, banana chips, and roasted almonds) were packed in a well sealed cup. The rate of moisture transfer between the components was assumed to be limited by the component with the lowest effective diffusion coeff. divided by the square of half of smallest dimension (i.e. D_{eff}/L_0^2) value. The surface moisture content of the rate determining component was assumed to be in equilibrium with the other component(s) at all times. The mean error between the experimental and predicted moisture values with time ranged from 0.28% to 0.84% as a percentage of moisture content. AA

IGLESIAS (HA), CHIRIFE (J) and FERRO FONTAN (C). Temperature dependence of water sorption isotherms of some foods. **J. Food Sci. 51**(3); 1986; 551-3

In some foods, effect of temp. on sorption isotherms **may** be taken into account by considering only the effect of temp. on the monolayer moisture content. Therefore, it is possible to predict the temp. dependence along the isolation by knowing the variation with temp. of the monolayer. Hailwood-Horrobin model for water sorption has been used to study the physico-chemical basis of this behaviour. It is suggested that structural modification induced by temperature in the substrate plays an important role in the observed phenomena. MVG

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

8 HUANG (AS) and ELBE (JH). Stability comparison of two betacyanine pigments - Amaranthine and betanine. **J. Food Sci. 51**(3); 1986; 670-74

Amaranthine was extracted from fresh leaves and amaranthine, betanine and thin degradation products were quantified by HPLC. The degradation reaction of amaranthine was partially a reversible reaction, as with betanine. Amaranthine was less stable than betanine in the absence of O_2 while stability was almost equal in the presence of excess of O_2. MVG

9 URASHIMA (T), SUYAMA (K) and ADACHI (S). 1,6-anhydro-3,4-O-furfurylidene-β-D-galactopyranose, a new furfurylidene derivative formed from lactose during pyrolysis. **J. Food Sci. 51**(3); 1986; 675-8

A new furfurylidene derivative which tastes bitter was separated from lactose heated at 200°C for 20 h by ethyl acetate extraction and preparative thin-layer chromatography. The compound was identified as the **trans** isomer of 1,6-anhydro-3,4-O-furfurylidene-β-D-galactopyranose by ultraviolet, infrared, mass and ^{1}H-NMR spectroscopy. The compound and its **cis** isomer were identified in the reaction mixture of furfural and levoalactosan heated at 175°C for 2 h with nitric acid. AA

10 BEUTLER (HO), WURST (B) and FISCHER (S). A new method for the enzymatic estimation of nitrate in foods. **Dtsch. Lebensmittel-Rundschau. 82**(9); 1986; 283-9 (German)

Nitrate is reduced to nitrite by NADPH, in the presence of a highly purified nitrate reductase from **Aspergillus niger** (EC 1.6.6.2). The quantity of NADPH consumed - which is proportional to the concn. of nitrate - is measured photometrically. There is some interference due to secondary activity of nitrate reductase, but it can be reduced to negligible proportions by using an imidazol-buffered system. The optimal reaction conditions are: pH 7.3, FAD 3-8 μ mol/l, NADPH 220 μ mol/l, nitrate reductase 70 U/l. The reaction is linear in the range of 4-130 μ mol nitrate/l, and comes to an end in 40 min. When the nitrate concn. is 130 μ mol/l. The detection limit may be put at 340 ng nitrate/cuvette. KMD

11 FLORENCE (E). Determination of sodium in salted foods using an ion-selective electrode. **Analyst. 111**(5); 1986; 571-3

This work investigated the use of the sodium ion-selective electrode in the analysis of a wide variety of cheese, butter and other salted foods. Good agreement was found when the results for cheese were compared with those found by reference method but a bias of +7-9% was found for results of ion-selective electrode over the results from reference method for butters. AA

12 RAMANBHAI B PATEL, MUKESHBHAI R PATEL, AMBUBHAI A PATEL, SHAH (AK) and AJAYBHAI G PATEL. Separation and determination of food colours in pharmaceutical preparations by column chromatography. **Analyst. 111**(5); 1986; 577-8

13 SANDBERG (A-S) and AHDERINNE (R). HPLC method for determination of inositol tri-, tetra-, penta-, and hexaphosphates in foods and intestinal contents. **J. Food Sci. 51**(3); 1986; 547-50

A rapid HPLC method for detn. of the above compounds in foods and intestinal contents was developed and tested for occurrence of inositol phosphates in raw bran, an extruded-cooked bran product, textured soyflour and intestinal contents. The method gave reproducible values which differed from those obtained by precipitation methods in some samples. MVG

14 SMID (JR) and KRUGER (BJ). Measurement in the non-linear region of the calibration graph of the fluoride ion-selective electrode by blank adjustment. **Analyst. 111**(4); 1986; 467-70

FOOD LAWS AND REGULATIONS

Nil

FOOD MICROBIOLOGY

15 WANG (GIJ) and FUNG (DYC). Significance of bacterial catalase in food microbiology: A review. **J. Food Safety. 8**(1); 1986; 47-67

Pseudomonas

16 PAQUETTE (GJ) and McKELLAR (RC). Optimization of extracellular lipase activity from **Pseudomonas fluorescens** using a super-simplex optimization program. **J. Food Sci. 51**(3); 1986; 655-8

Salmonella

17 BECKERS (HJ), LEUSDEN (FM) and PETERS (R). Comparison of Muller-Kauffmann's tetrathionate broth and modified Rappaport's medium for isolation of salmonella. **J. Food Safety. 8**(1); 1986; 1-9

Results from the two methods did not markedly differ with respect to the proportion of positive samples or sero- and phage types of salmonellae isolated from minced beef and pork. It was also demonstrated, in minced meat samples inter added salmonellae, that the changes of detecting salmonellae increase with increasing numbers present initially. Additionally, the presence of minced meat and its competing microflora have an unpredictable effect on the detection of salmonellae. MVG

Auricularia polytricha

18 LU (JY) and TANG (AY). Cellulolytic enzymes and antibacterial activity of **Auricularia polytricha**. **J. Food Sci. 51**(3); 1986; 668-9, 674

Auricularia polytrichia, an edible fungus, was grown in the lab. and examined for comp. and its ability to hydrolyze cellulose and hemicellulose. On a dry wt. basis **A. polytricha** was highest in protein (7.59%), followed by fiber (3.69%) and lowest in fat (1.12%). Appreciable amounts of Ca and Zn were also present in the fruiting body of **A. polytricha**. The fungus produced substantial amounts of cellulase and hemicellulase. The optimum conditions were pH 4 and 30 C for cellulase, and pH 6 and 60 C for hemicellulase. **A. polytricha** also produced an antibacterial substance and inhibited the Gram positive bacteria, **Bacillus subtillus**, **Bacillus cereus**, **Micrococcus luteus**, and **Staphylococcus aureus**, but not Gram negative bacteria, **Alcaligenes viscolactis**, **Escherichia coli**, and **Pseudomonas fluorescens**. AA

Mushroom

19 CHIANG (BH), CHU (CL) and HWANG (LS). Mushroom blanch water concentration by membrane processes. **J. Food Sci. 51**(3); 1986; 608-13

Mushroom blanch water was concn. by ultrafiltration (UF) and reverse osmosis (RO). UF prefiltration was essential in preventing severe fouling during the RO process. When the UF blanch water permeate was processed by RO, linear relationships between pressure and flux were observed at all conçn. tested. The blanch water was concn. by UF/RO from 2% to 13% total solids at 60 C and 120 KPa/5000 KPa operating pressures with flux higher than 15 L/m^2 h. Max. concn. obtained was approx. 20% total solids with 90% recovery of the nonvolatiles. Recoveries of some major volatiles were above 50%. Panelists could not differentiate the original from the reconstituted blanch waters in sensory evaluations. AA

20 SATYABHAMA GHOSH and MAJUMDER (SK). Effect of some minerals on the production of **Morchella esculenta** mycelium. **J. Food Sci. Technol. (India) 23**(4); 1986; 232-3

Morchella esculenta mushroom was grown in synthetic medium containing sucrose, 4.5%; $NaNO_3$, 0.73%; KH_2PO_4 0.05-0.17%; $MgSO_4 \cdot 7H_2O$ 0.02-0.20%, $CaCl_2 \cdot 2H_2O$, 0.1-2.00%, $FeSO_4 \cdot 7H_2O$, 1.5-2.8 and $ZnSO_4 \cdot 7H_2O$, 0.5-3.0 mg/100 ml; the mycelial wt. was determined in each case. Optimum levels of KH_2PO_4 and $MgSO_4 \cdot 7H_2O$ are 0.1 and 0.5% resp. and those of $FeSO_4 \cdot 7H_2O$ and $ZnSO_4 \cdot 7H_2O$ are 0.0023 and 0.0015% resp. Ca has got stimulatory effect on growth, optimum concn. being 0.5%. The mycelial yield was 16.8 g/l, at optimum pH of 6.5 ± 0.1. KAR

Dosa

21 LABANA (AK) and KAWATRA (BL). Studies on protein quality and availability of zinc from **dosa**. **J. Food Sci. Technol. (India) 23**(4); 1986; 224-7

Plain **dosa** (a breakfast item in India prepared from the dough of rice and blackgram dal in 2:1 ratio and frying on pan) containing 22.6 ppm Zn, Zn supplemented (50 p.p.m. Zn) **dosa**, raw **dosa** mixture alone and with Zn supplementation (50 p.p.m. Zn) were fed to Wistar albino rats for 4 wk and compared with skim milk powder (9.5 p.p.m Zn) diet. Body wt., PER, liver wt. and liver protein content were less in Zn unsupplemented **dosa** diet than in supplemented **dosa** diet. Rats absorbed more N and Zn from Zn suplemented plain **dosa** diet than from other diets. Zn availability was more in plain **dosa** diet than that from raw **dosa** mixture. KAR

22 SONI (SK), SANDHU (DK), VILKHU (KS) and KAMRA (N). Microbiological studies on **dosa** fermentation. **Food Microbiol. 3**(1); 1986; 45-53

Bacteria alone or in combination with yeasts were found to be responsible for the fermentation of **dosa** - an indigenous Indian fermented food. **Leuconostoc mesenteroides, Streptococcus faecalis, Lactobacillus fermentum** and **Bacillus amyloliquefaceins** were the predominant bacteria responsible for souring and leavening of dosa batter. Yeasts whenever present, belonged mainly to **Saccharomyces cerevisiae, Debaryomyces hansenii** and **Trichosporon beigelli**. They produced flavour, enzymes and helped in the saccharification of starch. Both bacteria and yeasts were contributed by the ingredients **Oryza sativa** and **Phaseolus mungo.** The prevalence of bacteria and yeasts was affected by seasonal variations but bacteria always dominated the overall microbial load. AA

FOOD ADDITIVES

Nil

CEREALS

23 KLEIN SCHIPHORST (HAJ). Determination of flour components using the NIROS system. **Getreide Mehl Brot. 40**(3); 1986; 78-81 (De)

Messrs. Simon in collaboration with FMBRA, Chorllywood, have developed an instrument for the continuous measurement of protein and moisture in flour, by near infra-red measurements. Details of the apparatus and its mode of operation have been reported. KMD

24 CHOPRA (N) and HIRA (CK). Effect of roasting on protein quality of cereals. **J. Food Sci. Technol. (India) 23**(4); 1986; 233-5

Wheat, maize and paddy were **roasted** with sand at 220-280° C for $2-2\frac{1}{2}$ min and fed to rats (wheat and maize diet had 10% protein and rice diet % protein) and the true digestibility (TD), biological value (BV) and net protein utilization (NPU) were estimated. Methionine content slightly increased in maize and rice and lysine content decreased by 40% in wheat, 54% in maize and 68% in rice by roasting. PER of raw and roasted grains were: wheat 1.61 and 1.05, maize 121 and 1.38, and rice 1.67 and 1.54 resp. The relative N utilization also decreased on roasting and the effect was max. in rice followed by maize and wheat. TD coeff. of roasted grain was highest for rice and lowest for maize. The BV of raw wheat (58.78) and raw rice (71.12) as also of maize (74.53) decreased to 50.91, 37.80 and 52.76 resp. on roasting. Roasting lowered the protein quality of these grains. KAR

25 REICHERT (RD), TYLER (RT), YORK (AE), SCHWAB (DJ), TATARYNOVICH (JE) and MWASARU (MA). Description of a production model of the tangential abrasive dehulling device and its application to Breeders' samples. **Cereal Chem. 63**(3); 1986; 201-7

Barley

26 MARCHYLO (BA), KRUGER (JE) and HATCHER (D). High-performance liquid chromatographic and electrophoretic analysis of hordein during malting

for two barley varieties of contrasting malting quality. **Cereal Chem. 63**(3); 1986; 219-31

Oats

27 LOOKHART (G), ALBERS (L) and POMERANZ (Y). The effect of commercial processing on some chemical and physical properties of oat groats. **Cereal Chem. 63**(3); 1986; 280-82

Commercial processing, especially heating does not affect the avenin electrophoretic pattern of originally cleaned oat groats after drying at 121°C, although small differences in gross composition (protein, ash, oil and carbohydrates) and changes in microscopic appearance were observed. BSN

Rice

28 BRECKENRIDGE (C) and ARSECULERATNE (SN). Laboratory studies on parboiled and raw rough rice and their milling fractions as substrates for the production and accumulation of aflatoxin. **Food Microbiol. 3**(1); 1986; 67-72

The aflatoxin producing potential of raw and parboiled rough rice and their milling fractions was investigated. Higher levels of toxin were produced in parboiled rough rice than in raw rough rice. The toxin was confined mainly to the bran and husk, the bran showing a higher toxin concentration. The bran from parboiled rice produced higher toxin levels than raw bran. The inoculated endosperm produced only traces of toxin with no difference between the two types of rice. The variation in toxin producing capacity was attributed to the chemical nature of the different substrates. The parboiling process probably made the rice lipids more easily available for fungal metabolism, resulting in parboiled rice bran having the highest toxin producing capacity. Toxin development in the starch rich endosperm, in the absence of the surrounding bran appeared unlikely. AA

29 MURUGESAN (G) and BHATTACHARYA (KR). Studies on puffed rice. 1. Effect of processing conditions. **J. Food Sci. Technol. (India) 23**(4); 1986; 197-202

Puffed rice was prepared by varying the processing conditions like sand grade, and quantity, roaster r.p.m in sand puffing, time and temp. of puffing, air flow rate, and also changing the grain quality like grain moisture content, immature grains, cracked grains, parboiled grains, and also using salt and sun-dried grains. Puffing was done using (i) a small lab. coffee roaster and (ii) a small hot air puffing system, using 25 g of paddy in each experiment. Puffing of grains with 14% (wet basis) moisture in either system and (ii) sand puffing at about 200°C, air puffing at 225°C at an air flow rate of 1.5 m^3/min was optimum for puffing. Immature kernels did not puff well but cracked grains gave slightly increased puffed vol. Parboiling reduced puffing. Addition of salt increased puffed vol. appreciably and also shifted the optimum moisture content to 17%. Sun-drying of paddy before moisture adjustment substantially increased the puffed vol. KAR

30 SHARP (RN) and TIMME (LK). Effects of storage time, storage temperature, and packaging method on shelf life of brown rice. **Cereal Chem. 63**(3); 1986; 247-51

Storage of brown rice at 3°C either in heat-sealed two poly laminated polyethylene bags, in sealed polyethylene bags insealed polyethylene bags sealed in metal cans or in perforated bags in metal cans, resulted in lower level of FFA and less changes in odour and flavour than when stored at higher temp. The best shelf life resulted from a combination of 3°C storage temperature and use of a sealed polyethylene bag. BSN

31 SHARP (RN). Quality evaluation of milled aromatic rice from India, Thailand, and the United States. **J. Food Sci.** 51(3); 1986; 634-6

Some of the quality differences in Della rice (US), Jasmine (Thailand) and Basmati (India) samples. All samples had comparable degree of milling. Jasmine was whiter than all samples. Della rice samples were not as white as Basmati samples. Della AR (Arkansas) was less red and yellow than Della LA (Lousiana) samples. The uncooked Della samples were as long as the others but the greater length:width ratio caused Basmati to appear longer. In 1000 kernel wt., Della and Jasmine were greater than Basmati. Della samples had intermediate to high intermediate gelatinisation temp., medium gel consistency, intermediate amylose content and cooking quality. No flavour differences could be detected between samples by a sensory panel. MVG

Triticales

32 MACRI (LJ), BALLANCE (GM) and LARTER (EN). Changes in the alpha-amylase and protease activities of four secondary hexaploid triticales during kernel development. **Cereal Chem.** 63(3); 1986; 267-70

Wheat

33 BECHTEL (DB) and BARNETT (BD). A freeze-fracture study of storage protein accumulation in unfixed wheat starchy endosperm. **Cereal Chem.** 63(3); 1986; 232-40

34 CAMPANA (LE), SEMPE (ME) and FILGUEIRA (RR). Effect of microwave energy on drying wheat. **Cereal Chem.** 63(3); 1986; 271-3

Measurement of total protein content of wheat by microwave drying was not affected by heating upto 91°C. However, germination and wet gluten content were progressively affected by temp. above 60 and 66°C resp. BSN

35 CHERDKIATGUMCHAI (P) and GRANT (DR). Enzymes that contribute to the oxidation of L-ascorbic acid in flour/water systems. **Cereal Chem.** 63(3); 1986; 197-200

The enzymes lipoxygenase (LOX), peroxidase (POD), and polyphenol oxidase (PPO) were investigated to determine whether they contribute either directly or indirectly to the oxidation of L-ascorbic acid (AA) in wheat flour. Water extracts of untreated patent Canadian hard red spring wheat flour contained significant amounts of both LOX and POD but no ascorbate oxidase (AOX) activity. However, significant AOX activity was found in flour/water suspensions. When the flour residue from a water extraction was subsequently extracted with 75% saturated Na_2SO_4 sol. 60% of the AOX activity of the flour suspension was solubilized, but this extract showed neither LOX nor POD activity. The assay for PPO showed no activity in the patent flour, although activity was detected in a whole wheat flour. It was concluded that patent flour contains an enzyme capable of oxidizing AA that is distinctly different from LOX, POD, or PPO. AA

36 DOUBLIER (JL), COLONNA (P) and MERCIER (C). Extrusion cooking and drum drying of wheat starch. II. Rheological characterization of starch pastes. **Cereal Chem.** 63(3); 1986; 240-46

Native wheat starch was processed by twin-screw extrusion cooking under five operating conditions, varying feed moisture (19-44%), and barrel temp. (90-180°C). These were compared to two drum-dried starches prepared by industrial processing. The cold water behaviour and the pasting pattern below 85°C were mainly ascribed to macromolecular entanglements in the solid-phase structure. Extruded samples, except for one processed at pasta-like conditions, exhibited lower cold water swelling and higher solubility than drum-dried starches. The hot paste rheology of dispersions heated above 90°C was directly related to the overall macromolecular characteristics as determined by intrinsic viscosity. From viscograms and flow measurements, a transition-like phenomenon was evident within the range 85-90°C. Although extrusion cooking led to much thinner pastes than drum drying, some similar behaviours were observed under specific conditions. AA

37 EL-BAYA (AW), FRETZDORFF (B) and MUNZING (K). The behaviour of lipids during storage of wheat under controlled atmosphere. **Getreide Mehl Brot. 40**(3); 1986; 71-8 (De)

Wheat with relatively high water activity (0.7-0.8) can be stored easily for 10 months at 15-18°C, under an atm. of low O_2 content. Only under conditions of extremely high humidity (grain moisture 20%, a_w value = 0.9) do sensory changes and biochemical reactions occur, inspite of the low level of O_2. The storage life, under these latter conditions, is just 1-2 months. Deteriorative changes in gluten and baking quality as well as decomposition of polar lipids, at extrmely high grain moisture contents, can be kept within acceptable limits by cooling to 8°C. KMD

38 FINNEY (PL) and ANDREWS (LC). Revised microtesting for soft wheat quality evaluation. **Cereal Chem.** 63(3); 1986; 177-82

A revised two-phase quality evaluation microprocedure for early generation screening of wheat is described. Improved milling and baking predictability and labour-savings were accomplished by enlarging the sieve housing and adding a 94SS sieve to the Quadrumat Jr. micromilling method. The added sieving enabled relative wheat hardness to be differentiated, which saved labour by replacing the Labconco-ground particle size index test. Furthermore, use of the additional sieve improved milling quality predictability by relating Quadrumat to Allis-Chalmers break-flour yields with a correlation coeff. of about 0.98. Additional labour savings and improved predictability resulted, because tempering of wheats before experiment milling was unnecessary if two regression coeff. expressing the effects of wheat moisture on Quadrumat break-flour yield and Quadrumat flour yield were used to correct all data. With or without tempering, the throughs of the Quadrumat 94SS correlated best with the Allis-Chalmers mill alkaline water retention capacity (AWRC) values. However, acceptable Allis AWRC predictability was accomplished on the combined flours of the 94SS overs and throughs. The combined flours had the advantage of yielding AWRC values essentially unaffected by variable wheat moisture content during milling. AA

39 HOSENEY (RC), ZELEZNAK (K) and LAI (CS). Wheat gluten: A glassy polymer. **Cereal Chem.** 63(3); 1986; 285-6

40 LUPANO (CE) and ANON (MC). Denaturation of wheat germ proteins during drying. **Cereal Chem.** 63(3); 1986; 259-62

Drying of wheat grains resulted in denaturing of germ wheat proteins and disappearance of certain polypeptides. Differential scanning calorimetry studies suggest that deterioration of wheat germ by high temp. follows a first-order kinetics. BSN

41 OHNISHI (M), OBATA (S), ITO (S) and FUJINO (Y). Composition and molecular species of waxy lipids in wheat grain. **Cereal Chem.** 63(3); 1986; 193-6

Waxy lipid (acylsterols, shorter alkylesters, hydrocarbons and longer alkylesters) content in neutral lipids of wheat grain were 1.4, 0.5, 0.4 and < 0.1% resp. Palmitoyl sitosterol and linoleoyl sitosterol were the major species of acylsterols, while methyl linoleate and methyl palmitate accounted for the shorter alkyl esters. Alkanes were predominant and the presence of hydrocarbons, alkanes, alkenes and squalene were detected. Main species of alkanes were C_{25}, C_{27} and C_{29}, while longer alkyl esters were C_{40}, C_{42} and C_{46}, with the major species representing palmitoy, hexacosanol, arachidoyl tetracosanol, palmitoyl tetracosanal and behenoyltetracosanol. BSN

2 OKADA (K), NEGISHI (Y) and NAGAO (S). Studies on heavily ground flour using roller mills. I. Alteration in flour characteristics through overgrinding. **Cereal Chem.** 63(3); 1986; 187-93

Two commercial mill streams, extracted from the inner (stream A) and outer (stream X) part of the endosperm of no. 1 Canada western red spring wheat were reground up to 10 times with a Miag Vario-Roller mill, and changes in flour characteristics were studied. As the number of passes through the rolls increased, the bromate requirements lessened, the SH content of the water-soluble fractions and the sulphydryl/disulphide ratio decreased, and the valorimeter value of the farinogram increased. These changes may have resulted from the oxidation of flour components during overgrinding by roller milling. Activities of α- and β-amylase were not altered, but protease activity decreased, and amylograph viscosity decreased slightly with progressive overgrinding. Overgrinding of the flour streams caused some minor shifts in the proportions of the protein fractions. The bread-baking properties of stream A, except for an increase in baking absorption, were unchanged, whereas the bread-baking properties of stream X improved with severe overgrinding. When starch damage was over 11%, the peaks at 75°C in Do-Corder curves were higher than the peaks at 85 and 95°C. AA

3 PALIWAL (SC) and GURUMUKH SINGH. Physico-chemical, milling and bread making quality of wheats of Uttar Pradesh. **J. Food Sci. Technol. (India)** 23(4); 1986; 189-93

13 var. of **Aestivum** wheats of Uttar Pradesh were evaluated for physico-chemical, milling and bread making characteristics. The range of values for physical characteristics were hectoliter wt. 73.1-80.0 kg, 1000 kernel wt. 40.3-53.2 g and grain hardness (as crushing resistance) 8.63-12.65 kg/grain. The var. contained (in %) protein (N x 5.7) 8.82-15.85, fat 1.53-2.15, ash 1.44-2.05, crude fibre 2.40-4.11 and total carbohydrates (by difference) 80.14-87.93. The flour yield was 55.48-72.56% and contained (%) wet gluten, 12.77-44.06, ash 0.39-0.78, crude fibre 0.27-0.97 and sedimentation value was 17-35.3 ml; damaged starch 2.8-5.7% and diastatic activity 171-388 units and Pelshenke value 82-133 min. Specific vol. of breads prepared from 100 g white flour ranged from 2.93 to 3.75 cc/g. Only VL-421 showed excellent bread making characteristics. KAR

4 PETERSON (CJ), JOHNSON (VA) and MATTERN (PJ). Influence of cultivar and environment on mineral and protein concentrations of wheat flour, bran and grain. **Cereal Chem.** 63(3); 1986; 183-6

5 RAHIM (A), VATSALA (CN), VENKATESWARA RAO (G) and SHURPALEKAR (SR). A small scale process for milling of wheat. Part II. A process for coarse grit (Dalia) milling. **J. Food Sci. Technol. (India)** 23(4); 1986; 193-6

Indigenously available equipments like huller, chakki, sifter with suitable modification in the grinding and sieving system has been used to develop a process for getting 84-88% yields of coarse grit (dalia) from wheat. These grits were compared with market samples. Total and acid insoluble ash contents ranged from 1.33 to 2.10% and 0.05 to 0.14% in market samples, while the values were 1.22-1.59 and 0.03-0.07% resp. in milled coarse grits. The cooking time for market samples was 9-12 min and for those obtained by improved process was 6-

8 min. Water uptake was 226-348% for market sample dalia and 316-410% for those milled in the above process. Dalia from medium hard wheat gave higher yields and good textured product after cooking than dalia from soft white wheat. KAR

46 VENKATESWARA RAO (G), WEIPERT (D) and SEIBEL (W). Effect of additives on the rheological and baking characteristics of different extraction rate wheat flours. **J. Food Sci. Technol. (India).** 23(4); 1980; 183-9

Effect of ascorbic acid at 20, 40, 60 and 80 p.p.m levels with and without sodium stearoyl-2-lactylate (SSL) at 0.5% on rheological and baking characteristics of 70, 75, 80, and 85% extraction wheat flour from WG 357, WL 711, Jubilar and DNS var. of wheat was studied. Among the wheat samples the min. and max. improvement by ascorbic acid for different extraction rate flours ranged between 2-4 and 8-16 min in final proof time, 10-40 and 40-110 Brabender units (BU) in elasticity of dough and 65-140 and 130-365 BU in dough level. When combined with SSL the increase was 4-10 and 8-20 min in final proof time, 5-55 and 50-110 BU in elasticity of dough and 35-210 and 270-430 BU in dough level. Addition of ascorbic acid showed min. and max. range of improvement in different extraction rate flours in the range of 20-55 and 155-240 ml in baking vol. 25-100 and 50-155 ml in oven-rise and 15-40 and 112-170 ml in loaf vol. By the addition of SSL these values improved to 40-245 and 175-350 ml in baking vol., 70-110 and 90-235 ml in oven rise and 67-151 and 129-248 in calculated loaf vol. Bread vol. specific vol. and overall quality score also increased by additives in different flours. Additives improved the bread crumb softness in all the var. in flours of all extraction rates tested. Jubilar and DNS wheat var. showed good response to the additives followed by WL 711 while WG 357 which responded poorly. KAR

MILLETS

Maize

47 MORAD (MM), ISKANDER (FY), ROONEY (LW) and EARP (CF). Physicochemical properties of alkali-cooked corn using traditional and presoaking procedures. **Cereal Chem.** 63(3); 1986; 255-9

Compared to the traditional alkali cooking for corn, a 40% reduction in cooking time was achieved by presoaking before alkali cooking. Presoaking of white and yellow dent corn for 12 h allowed imbibition of 45% of water and a 40-fold increase in Ca content. When presoaked or raw corn was cooked, dry matter losses, water uptake, Ca content, and enzyme-susceptible starch increased whereas amylograph max. viscosity decreased. For tortilla preparation, cooking 50 min after presoaking was required to optimally cook white or yellow corn compared to 80 min for the traditional alkali-cooking method. AA

48 POMERANZ (Y) and CZUCHAJOWSKA (Z). Rapid and simple detection of a mixture of wet and dry corn. **Cereal Chem.** 63(3); 1986; 283-4

Within 24 hours of blending of wet and dry corn, only 6% moisture may be detected based on comparison between moisture determined by the conductance Toy-Heppenstall and oven drying or between the conductance and other electrical methods. BSN

Ragi

49 SHUKLA (SS), GUPTA (OP), SWARKAR (NJ), TOMAR (AK) and SHARMA (YK). Malting quality of ragi varieties: Nutrient and mineral composition of their malts. J. Food Sci. Technol. (India) 23(4); 1986; 235-7

Malts were prepared from 8 brown and white var. (JNR 852, JNR

981, JNR 1008, PR 202, WR 13, CO 9, WR 5, and WR 4) of ragi (**Eleusine coracana**). Var. differed significantly in crude protein (4.6 to 5.7%), non protein N (0.148 to 0.346%), true protein (2.6 to 4.8%), carbohydrate (73.7 to 83.1%), soluble sugar (2.9 to 9.9 mg/100 g), fat (1.2 to 2.3%) and phytic acid (160 to 190 mg/100 g) contents. Amylase activity was higher in malt from brown var. than from white var. The range in mineral composition (mg/100 g) among the var. was S 88.5 to 137.0, Mg 170.6 to 233.4, Fe 6.7 to 10.2, Cu 0.75 to 1.10, Zn 2.5 to 3.5, Mn 24.0 to 62.1. KAR

Sorghum

50 ANON. II. The development and assessment of the saccharogenic activities of the alpha- and beta-amylases. **Brewers Dig. 60**(12); 1985; 27-9

From the third day of germination some beta amylase activity was detected in two var. of sorghum (L187 and SK 5912) and by the fifth day, alpha amylase accounted for only 76.9% and 80.7% of the saccharogenic activities of the total activities of the extracts of L187 and SK 5912 resp. KAR

51 MANJREKAR (C), NUSRATH NASEER and VISHALAKSHI (MP). The effect of polishing jowar (**Sorghum vulgare**) on the nutritive value of protein. **J. Food Sci. Technol. (India) 23**(4); 1986; 228-31

Unpolished and polished (10-12%) jowar was fed to rats for 28 days as such or with lysine supplementation and the PER was determined. PER and fat content of the liver was also determined in rats fed 11-month stored, polished and unpolished jowar, jowar polished up to 19.3%, and jowar polished to different degrees was compared with control (casein) combined with 8, 15, and 20% cellulose. PER and NPU of unpolished jowar was higher than polished jowar. Lysine supplementation increased the PER. Polishing between 5 and 8% was found optimal. Neither polishing nor storage for 11 months affected the protein quality of jowar; unpolished stored jowar gave higher PER of 0.87 compared to 0.61 for polished jowar. Readdition of bran to flour of polished jowar gave a PER of 1.03 against 1.20 for unpolished jowar. Jowar bran added to a control casein diet reduced its PER as also did pure cellulose at 20 and 15% level but not at 8%. The NPU values were 8.26% for control (casein), 50.9% for unpolished jowar and 43.9% for polished jowar. Polishing the jowar did not lead to any nutrition-specific changes of the protein, since PER values of unpolished and polished jowar with readdition of the removed bran were almost equal. KAR

52 OKON (EU) and UWAIFO (AO). Evaluation of malting sorghums. I. The malting potential of Nigerian varieties of sorghum. **Brewer's Dig. 60**(12); 1985; 24-7

PULSES

53 SCHAFFNER (DW) and BEUCHAT (LR). Functional properties of freeze-dried powders of unfermented and fermented aqueous extracts of legume seeds. **J. Food Sci. 51**(3); 1986; 629-33

Freeze-dried powders from aqueous extracts of cowpea, peanut and soybean seeds were compared with commercial cultured buttermilk powder for functional properties. Powders of extracts fermented with **Lactobacillus bulgaricus** and **Streptococcus thermophilus** were also analysed. The colours of freeze dried powders and commercial butter milk powder were similar and fermentation had a beneficial effect. Emulsion capacities foam capacity and stability of freeze dried legume powders were superior to commercial butter milk powder. Similar nitrogen solubility profiles were obtained with both legume powders, and commercial product; but nitrogen solubility profiles was less in fermented extracts than in unfermented products. The viscosity of rehydrated powders was less than controls (unfermented) but better than that of commercial product. The water absorption capacity of all seed extract powders was similar and was not affected by fermentation. MVG

Cicer soongaricum

54 KATIYAR (SK) and BHATIA (AK). Fatty acid composition of **Cicer soongaricum** Steph. seed oil. **J. Indian Chem. Soc. 63**(4); 1986; 447-8

Cicer soongaricum Steph. (local name: "**sarri**") is a wild leguminous plant, the seeds of which are consumed by the local inhabitants in Northern Kashmir. The seeds contain 7.2% oil having the following characteristics: refractive index. 1.472; iodine value 107; saponification value 193. The unsaponifiable matter was 4.5%. The fatty acid composition of the seed oil was linoleic 37.13; stearic 25.38; lauric 23.05; and linolenic 6.10; Myristic, palmitic, and arachidic acids were present in lesser concn. Two unidentified compounds were also detected. KMD

Dry beans

55 AGBO (GN), UEBERSAX (MA), HOSFIELD (GL) and MARKAKIS (P). Water uptake and flour gelatinization of three dry bean cultivars (**Phaseolus vulgaris** L.). **J. Food Sci. 51**(3); 1986; 850-51

The water uptake and starch pasting of three dry bean (**P. vulagaris** L.) cultivars, Sanilac, San Fernando and Nep-2, were examined in an effort to understand certain palatability differences among them. Sanilac displayed the highest water uptake, followed by Nep-2 and that by San Fernando. Brabender amylograms on whole bean and decorticated bean flours did not show sharp pasting peaks, but paste viscosity of all cultivars increased on cooling, indicating retrogradation occurred. The San Fernando flour pastes were the least viscous among the three cultivars; the pastes of the other two cultivars differed slightly in viscosity. Water absorption and pasting viscosity do not fully explain differences in palatability among these cultivars. AA

Moth beans

56 KHOKHAR (S) and CHAUHAN (BM). Antinutritional factors in moth bean (**Vigna aconitifolia**): Varietal differences and effects of methods of domestic processing and cooking. **J. Food Sci. 51**(3); 1986; 591-4

Four var. were examined and there were significant differences in phytic acid and saponin contents and trypsin inhibitor activity. No tannins and lectins were present. Effects of different treatments on level of antinutritional factors were also studied. Soaking dry seeds in plain water and mineral salt solution for 12 hours decreased phytic acid by 46-50% while sprouting for 60 hours markedly reduced saponin (44-66%). The other methods of processing including cooking were less effective. The processing methods involving heat treatment almost eliminated trypsin inhibitor activity while soaking and germinating partly removed the activity. MVG

Peas

57 LOPEZ (A), WILLIAMS (HL) and COLLER (FW). Essential elements and cadmium and lead in fresh and canned peas (**Pisum sativum** L.). **J. Food Sci. 51**(3); 1986; 604-7

Canned peas contained significantly lower concn. of Ca, Cu, Fe, Mg, Mn, P, K, Si and Zn than fresh peas. Higher concn. of Na and chloride were found in canned peas as NaCl was added during the canning process. It was estimated that 100 g of drained canned peas supplied < 11% of the RDAs except for Na and chloride. Retention of the elements ranged from 24-86% except for Na and chloride. MVG

58 MARTENS (M). Sensory and chemical/physical quality criteria of frozen peas studied by multivariate data analysis. **J. Food Sci. 51**(3); 1986; 599-603, 617

Efforts were made to establish sensory quality criteria for frozen peas. The ability of existing and traditional chemical and physical measurements to predict the sensory quality was also been studied. Principal component Analysis and Partial Least Squares regression were tried on each of the problems. MVG

Pigeon peas

59 SHEPHERD (H) and BHARDWAJ (RK). A study of the desorption isotherms of rewetted pigeon pea type-17. **J. Food Sci. 51**(3); 1986; 595-8

A best-fit desorption model has been established and the quantities like free energy change, heat of desorption and latent heat of vapourisation have been studied. MVG

Snap beans

60 SHEWFELT (RL), RESURRECCION (AVA), JORDAN (JL) and HURST (WC). Quality characteristics of fresh snap beans in different price categories. **J. Food Qual. 9**(2); 1986; 77-88

OILSEEDS AND NUTS

Coconuts

61 JAYALEKSHMY (A), ARUMUGHAN (C), NARAYANAN (CS) and MATHEW (AG). Changes in the chemical composition of coconut water during maturation. **J. Food Sci. Technol. (India)** 23(4); 1986; 203-7

Coconut water collected at 8 progressive stages (the first 4 considered as tender coconut and the last two as mature coconut) of maturity were analysed for chemical constituents. Titratable acidity was low at the first 3 stages but increased in the subsequent 3 stages followed by a drop. pH increased in the first 2 stages and dropped in the subsequent 2 stages followed by an increase in the final stage. Total solids showed a steep decline on maturation. Total and reducing sugars showed a progressive reduction during maturation the rate of reduction being higher for the latter. Total N and non protein N content increased with maturity. Protein content also increased sharply with maturity. Total fat increased steeply with increasing maturity both on % and per nut basis. During maturity increase in the relative proportion of fatty acids up to 14:0 and corresponding decrease in the higher unsaturated fatty acids were observed. Hexanoic acid appeared from the 4th stage. On % basis the total ash content showed very little variation, but on per nut basis it decreased substantially with maturation. K accounted for more than half of the mineral, which decreased on maturation giving place to sodium. Ca, Mg, Fe and Cu content of coconut water did not exhibit any particular trend during maturation. KAR

Soybeans

62 ELDRIDGE (AC), FRIEDRICH (JP), WARNER (K) and KWOLEK (WF). Preparation and evaluation of supercritical carbon dioxide defatted soybean flakes. **J. Food Sci. 51**(3); 1986; 584-7

Full-fat soybean flakes were extracted with supercritical carbon dioxide (SC-CO_2) at pressures of 10,600-12,400 psi, temp. from 80-100 C, and moisture levels of 5-13.5%. Conditions could be selected to produce defatted soybean meals with nitrogen solubility indices greater than 70% and flavour scores greater than 6.5 on a scale of 1 to 10 (1 = strong and 10 = bland). The usual grassy-beany and bitter flavours of hexane-defatted soybean flours were only minimally detectable in the optimally SC-CO_2-extracted materials. Bland, defatted soybean meal prepared by SC-CO_2 extraction was further processed into high-quality protein conc. and isolates that were stable when stored under adverse conditions. AA

63 FENG (IC) and NIELSEN (SS). Protein-protein interactions between soybean beta-conglycinin (B1-B6) and myosin. **J. Food Sci. 51**(3); 1986; 588-90, 607

Protein protein interactions between soybean beta-conglycinin (B1-B6) and myosin were studied by turbidity, solubility and SDS-polyacrylamide gel electrophoresis (SDS-PAGE) analysis. Turbidity and solubility studies showed that, under the experimental conditions used, these proteins interacted at temp. between 60 and 100° C, while SDS-PAGE analysis indicated that the interaction also occurred at 50 C. The interaction was such that no detectable complexing between these two proteins was observed. The presence of beta-conglycinin resulted in diminished aggregations of myosin heavy chains between 50 and 100°C. AA

Arecanuts

64 GOPAL NAIK and ARORA (VPS). Marketing pattern and pricing efficiency in Indian arecanut market. **Indian J. Agric. Econ. 41**(2); 1986; 172-86

TUBERS AND VEGETABLES

65 MANVELL (PM) and ACKLAND (MR). Rapid detection of microbial growth in vegetable salads at chill and abuse temperatures. **Food Microbiol. 3**(1); 1986; 59-65

In salad packs held at 7°C lactic acid bacteria formed a low proportion of the total population, whereas at 30°C lactic acid bacteria formed the dominant population. A rapid test for detecting lactic acid and a technique based on the Gram stain are described as methods providing indication of temp. abuse well before visual spoilage occurred. The Limulus lysate test was shown to be a simple and rapid method for assessing the microbial quality of salads stored at chill and thus would provide a useful indicator of shelf life. KAR

Carrots

66 ROOS (YH). Phase transitions and unfreezable water content of carrots, reindeer meat and white bread studied using differential scanning calorimetry. **J. Food Sci.** 51(3); 1986; 684-6

Jerusalem Artichoke

67 PAREKH (SR) and MARGARITIS (A). Continuous hydrolysis of fructans in Jerusalem Artichoke extracts using immobilized nonviable cells of **Kluyveromyces marxianus**. J. Food Sci. 51(3); 1986; 854-5

Potatoes

68 RODRIGUEZ (N) and ZARITZKY (NE). Modeling of sulphur dioxide uptake in pre-peeled potatoes of different geometrical shapes. **J. Food Sci. 51**(3); 1986; 618-22

Sulphur dioxide uptake by pre-peeled potatoes from dipping solutions was mathematically modeled. Diffusive mass transfer equations in porous medium were experimentally verified; residual levels of SO_2 were measured in the range of industrial operating conditions. Effects of sodium bisulphite solution concn, immersion time, size, shape, dry matter, density and velocity of the product were analyzed. Three geometric approximations to pre-peeled potato cuts were examined (spheres, cubes and parallelepipeds). The fitting of equations to experimental data determined the effective diffusion coeff. of SO_2 in potato tissue, which was compared to theoretical predictions in terms of molecular diffusivity, total solids content and tortuosity factor. AA

Sweet potatoes

69 PICHA (DH). Sugar content of baked sweet potatoes from different cultivars and lengths of storage. **J. Food Sci. 51**(3); 1986; 845-6, 848

Amaranthus

70 YANEZ (GA), MESSINGER (JK), WALKER (CE) and RUPNOW (JH). **Amaranthus hypochondriacus**: Starch isolation and partial characterization. **Cereal Chem. 63**(3); 1986; 273-6

Spinach

71 DeSOUZA (S) and EITENMILLER (RR). Effects of processing and storage on the folate content of spinach and broccoli. **J. Food Sci. 51**(3); 1986; 626-8

Free folate activities (FFA) dominated during most processing stages than total folate activities (TFA). Greater TFA resulted with steam-blanching than water-blanching. About 50% of TFA was lost in spinach during canning and another 10% was lost after storage for 3 months. Water-blanched spinach showed 27% TFA loss after 3 months storage at -32.2 C; broccoli showed 17% TFA loss after 8 months at the same storage. In the blanch water, 40% and 68% of TFA of spinach and broccoli were present respectively while only 1% and 4% TFA were in steam-blanch condensate. When canned, 14% of the TFA in spinach was in the liquid in the can immediately after canning. Storage (3 months) increased this amount. MVG

Cauliflowers

72 DIKSHIT (AK), HANDA (SK) and VERMA (S). Residues of methamidophos and effect of washing and cooking in cauliflower, cabbage and Indian colza. **Indian J. Agric. Sci. 56**(9); 1986; 661-6

Methamidophos applied (50 and 45 days after transplanting of cauliflower and cabbage and two sprays to Indian colza, one at flowering and second after 20 days to the foliage at the effective rates (0.03 and 0.05%) showed prolonged persistence on the leaves and curds of 'Snowball' cauliflower (**Brassica oleracea** Linn. var. **Botrytis** Linn.), head of 'Early Drum Head' cabbage (**Brassica oleracea** Linn. var. **Capitata** Linn.) and leaves and pods of 'Pusa Bold' Indian colza (**Brassica napus** Linn. var. **Glauca** (Roxb.) Schultz: syn. **Brassica campestris** Linn. var. **Sarson** Prain). For the safety of consumers, the required waiting was found to be 10 days for the leaves and curds of cauliflower, head of cabbage and leaves and pods of Indian colza. The residues were considerably reduced by washing and boiling of leaves (74.57 and 88.08%) and curds (68.18 and 86.63%) of cauliflower, head

(71.13 and 87.85%) of cabbage and leaves (69.55 and 84.07%) and pods (72.84 and 80.05%) of Indian colza. AA

Okra

73 KOTZEKIDOU (P) and ROUKAS (T). Characterization and distribution of lactobacilli during lactic fermentation of okra (**Hibiscus esculentus**). **J. Food Sci. 51**(3); 1986; 623-5

The distribution and identity of lactobacilli during natural fermentation of okra which is essential for the selection of starter cultures for the improvement of the quality of canned okra were studied. API 50 CHL system was used to present the fermentation characteristics of lactobacilli isolated on MRS agar at 30° C under anaerobic conditions. Nine phena were identified by the phenogram constructed by an unweighted, pair group, arithmatic average, linkage method and Jacquared similarity coeff. (1-Sj). The studies showed five homolactic species initially (**L. plantarum, L. casei** subsp. **Pseudoplantarum, L. acidophilus, L. leichmannii, L. salivarius** subsp. **salicinius**) and two heterolactic species (**L. cellobiosus** and **L. brevis**). Majority of strains isoalted after 24 h fermentation were **L. cellobiosus. L. plantarum** dominated during the final stage of fermentation. MVG

74 SUJATHA (VS), MADAAN (TR) and SESHADRI (VS). Oil content and its quality in seeds of wild and cultivated species of Abelmoschus. **Indian J. Agric. Sci. 56**(9); 1986; 657-60

Seeds of 9 cultivated var. of okra (**Abelmoschus esculentus** Linn. **Moench**) 3 var. of **A. moschatus**(Linn.) **Medic.**, 2 var. of **A. manihot** (Linn.) **Medic.**, and 1 var. of **A. manihot** (Linn.) **Medic** subsp. **Manihot** Waalkes, 2 unidentified sp., of **Abelmoschus** from Africa and 3 interspecific hybrids were assessed for oil content and quality. On a whole seed basis the oil content ranged from 11.8 to 17.3% in **A. esculentus** and 11.0 to 16.8% in other sp. and 12.2 to 13.9% in hybrids. No differences were found between the hybrids and their female parents. In the 20 collections examined, iodine value ranged from 78.6 to 126.7. Palmitic, oleic and linoleic acid constituted the main fatty acids.

Tomato juices

75 CRISTINA GANCEDO (M) and LUH (BS). HPLC analysis of organic acids and sugars in tomato juice. **J. Food Sci. 51**(3); 1986; 571-3

HPLC was used to investigate the effect of break temp. on changes in organic acids and sugars in canned juices from VF 145-7879 and UC 82B tomato var. Oxalic, citric, galaturonic, malic and pyrrolidone carboxylic acids were shown to be present in the juices. Increase in break temp. decreased oxalic and galacturonic acids. Fructose was present in slightly higher amounts than glucose. Sugar content was not significantly changed by break temp. with juices from UC 82B tomatoes. MVG

76 DIETZ (JM) and GOULD (WA). Effects of process stage and storage on retention of beta-carotene in tomato juice. **J. Food Sci. 51**(3); 1986; 847-8

Twelve tomato cv. were evaluated during commercial juice production and storage for retention of beta-carotene. Samples of fresh tomatoes, after extraction, pasteurization, canning, and after 7 months storage at 22 C were analyzed according to the AOAC methods (1980) for beta-carotene. There was a twofold difference in beta-carotene content between the highest and lowest cultivars in raw processed and stored product. A 20% loss of the beta-carotene content was observed during extraction and another 20% loss found after 7 months of storage. AA

Cucumbers

77 GEDUSPAN (HS) and PENG (AC). Changes in cucumber volatile compounds on chilling temperature and calcium chloride treatment. **J. Food Sci.** **51**(3); 1986; 852-3

The effects of chilling and $CaCl_2$ treatment on volatile compounds of European cucumber fruit were studied. European cucumbers were treated with/without $CaCl_2$, stored at 4.4°C and held at 20° C. Their volatile compounds were isolated and analyzed. Lauric, stearic and oleic acids decreased, whereas linoleic and linolenic acids increased by chilling and $CaCl_2$ treatment. Major volatile compounds were identified, trans-2-cis-6-nonadienal and trans-2-nonenal decreased, while hexanal, trans-2-hexenal and 2-pentylfuran increased on chilling and $CaCl_2$ treatment. The 6-nonenal and tetradecanal showed no clear trend. AA

FRUITS

78 DUNBAR (J). Use of sulphur dioxide in commercial drying of fruits and vegetables. **Food Technol. NZ.** **21**(2); 1986; 11, 13, 15, 37

A general article covering aspects like applications of SO_2, health aspects, use of SO_2 in dried vegetables and fruits and alternatives to SO_2 KAR

Apples

79 DRAKE (SR) and FRIDLUND (PR). Apple quality as influenced by method of $CaCl_2$ application. **J. Food Qual.** **9**(2); 1986; 121-7

Pressurized $CaCl_2$ treatment of apple fruits enhanced storage quality of both 'Golden Delicious' and 'Lord Lambourne' apples. Calcium dip treated apples were similar in storage quality to untreated apples. Apple fruits that were pressure treated with $CaCl_2$ were firmer than calcium dip treated or untreated apples. Calcium treatment, either pressure or dip treated, reduced pH and total browning. Quality parameters were influenced more by $CaCl_2$ at the first harvest than in a subsequent harvest. AA

Dates

80 JADDOU (H), MHAISEN (MT), AL-HAKIM (M), ZEKI (L) and AL-AMBAKY (MSH). Semi-pilot production of sucrose from dates and sweet sorghum using ethanolic extraction technique. **J. Food Sci. Technol. (India)** **23**(4); 1985; 241-3

A semi-pilot plant was designed (the sketch of the plant is given diagramatically) for the production of sucrose from dates (**Phoenix dactylifera**) var. Zahdi and sweet sorghum. Dates were cooked at 100° C for 1-1 1/2 h, juice extracted, filtered and conc., ethyl alcohol added, distilled and crystallized. In sorghum, the stalks were autoclaved at 121° C for 15 min, juice was pressed, evaporated and aqueous ethanol was added as above and crystallized. KAR

Elderberries

81 PFANNHAUSER (W). An analysis of volatile ingredients of elderberries. Part 3. Sensorial and gas chromatographical test on fractions of the aromatic extract. **Deutsche Lebensmittel-Rundschau.** 82(9); 1986; 289-93 (German)

A novel method for determining nitrate in food is described.

Nitrate is reduced to nitrite by NADPH in presence of a highly purified nitrate reductase from **Aspergillus niger** (EC 1.6.6.2). The consumption of NADPH that is equivalent to the concn. of nitrate is measured photometrically. The optimal reaction conditions are: imidazole buffer 36 mmol/l assay solution, pH 7.3, FAD 3.8 µmol/l, NADPH 220 µmol/l, nitrate reductase 70 U/l. The reaction is finished within 40 min at a max. nitrate concn. of 130 µmol/l. Organic components of food generally do not interfere with the nitrate reaction. Some phenolic components, however, inhibit the nitrate reductase to a small extent. A strong inhibition is observed in the presence of Mn^{++} (> 20 µmol/l assay solution), rhodanide ions (> 1 mmol/l),and cyanide ions (> 2 µmol/l). The effect of nitrite-ions (> 0.5 mmol/l) is a competitive inhibition. AA

Grapes

82 KING (SW) and BEELMAN (RB). Metabolic interactions between **Saccharomyces cerevisiae** and **Leuconostoc oenos** in a model grape juices/wine system. **Am. J. Enol. Vitic. 37**(1); 1986; 53-60

83 MATSUI (S), RYUGO (K) and KLIEWER (WM). Growth inhibition of Thompson Seedless and Napa Gamay berries by heat stress and its partial reversibility by applications of growth regulators. **Am. J. Enol. Vitic. 37**(1); 1986; 67-71

84 OH (HI) and HOFF (JE). Effect of condensed grape tannins on the **in vitro** activity of digestive proteases and activation of their zymogens. **J. Food Sci. 51**(3); 1986; 577-80

Only at concn. substantially higher than those likely to occur in human diets did grape tannins have a significant adverse effect on the **in vitro** digestion of bovine serum albumin (BSA). The activities of pepsin and chymotrypsin were at such levels (concn. 0.1%) significantly reduced. In contrast, that of trypsin increased markedly due to denaturation of BSA by the tannins. Tannin concn. the activation of chymotrypsinogen, while the activation of trypsinogen by enterokinase was drastically reduced at concn. as low as 0.05% due to precipitation of the subtrate. BSA digestion was markedly reduced in sequential multizymogen experiments at tannin concn. of 0.5% but not at 0.1%. AA

Papayas

85 CHAN (HT) Jr. Effects of heat treatments on the ethylene forming enzyme system in papayas. **J. Food Sci. 51**(3); 1986; 581-3

Heat inactivation studies were conducted on the ethylene-forming enzyme system (EFE) in papayas. Heat inactivation of the papaya EFE was biphasic and both phases followed first order kinetics. The activation energies E_a for the thermal inactivation of the heat resistant (HR) and the heat susceptible (HS) EFEs were 68.3 and 51.2 Kcal/mole, respectively. The thermodynamic constants for the heat inactivation of both EFEs were; enthalapy, 51.2 kcal/mole for HS and 66.7 kcal/mole for HR; free energy, 22.5 kcal/mole for HS and 23.3 kcal/mole for HR; entropy, 87.2 cal/deg-mole for HS and 137.8 cal/deg-mole for HR. The heat resistant EFE appeared to compromise about 25% of the total EFE activity. Commercial heat treatments used for quarantine treatments affected mainly the heat susceptible portion which comprised the remaining 75% of the total EFE activity. AA

Prunes

86 JOSHI (S), SRIVASTAVA (RK) and DHAR (DN): The chemistry of **Prunus armeniaca**. **Br. Food J. 88**(932); 1986; 74-8

A review of published information upto 1982, covers composition;

volatile components; oils; fatty acids; amino acids; carbohydrates; bitter principles; carotenes; tannins and related polyphenolic compounds; vitamins; nutritive value; enzymes; ripening of apricots; preservation; storage; deterioration; browning; apricot juice; apricot drinks; mineral composition and uses. BV

SUGAR, STARCH AND CONFECTIONERY

Sugar

87 GIANGIACOMO (R) and DULL (GG). Near infrared spectrophotometric determination of individual sugars in aqueous mixtures. **J. Food Sci. 51**(3); 1986; 679-83

Jaggery

88 MUDAHAR (GS), BHUMBLA (VK), MINHAS (KS) and SIDHU (JS). Effect of certain chemical additives on the shelf-life of jaggery (gur). **Res. Ind. 31**(1); 1980; 31-7

A study was initiated to extend the shelf-life of jaggery by adding (i) sorbic acid (200 p.p.m); and (ii) sorbic acid (200 p.p.m) + citric acid (0.1%) and packing in polyethylene-lined gunny bags. Chemical (moisture, total sugars, reducing sugars, fructose, acidity and ash), microbial and organoleptic (texture, colour, acceptability) studies have shown that gur samples treated with (ii) and packing in polyethylene lined gunny bags retained excellent consumer acceptability, golden yellow colour and texture during 12 months storage period without affecting the chemical characteristics. BSN

Confectionery

89 ANON. An introduction to the role of glucose syrups in sugar confectionery. **Conf. Prod. 52**(6); 1986; 359-60

Sumarises prevention of graining; hygroscopicity; viscosity; sweetness; browning/flavour development and colligative properties. BV

90 ANON. Dry roaster for nuts. **Conf. Prod. 52**(6); 1986; 382

91 ANON. Flavours and colours for confectionery, biscuits and ice cream. **Conf. Prod. 52**(6); 1986; 361-2

Covers red fruit flavours; vanilla; butter/cream flavours; citrus compounds; orange and lemon oils; essential oils/oleoresins; ginger; chocolate/cocoa and coffee flavours; nuts; tropical fruits flavours; yellow fruits flavours and colours. BV

BAKERY PRODUCTS

Biscuits

92 BALLESTER (D), CARRENO (P), URRUTIA (X) and YANEZ (E). Chemical composition and nutritional quality of sugar cookies containing full-fat sweet lupine flour (L. **albus** cv. Multolupa). **J. Food Sci. 51**(3); 1986; 645-6, 658

Full-fat sweet lupine flour (FFSL) (**Lupinus albus** cv. Multolupa) containing 35.4% protein was used to enrich the cookies given to a group of school children. FFSL replaced 5, 10, 15, 20, and 25% of wheat flour in the formula. Farinological study, physical dough properties, chemical comp. and nutritional quality of cookies were studied. The protein content of the cookies increased by 8.9% up to 55.7% for the 5% and 25% FFSL, resp. The highest PER (1.92) was found in cooking with 20% FFSL compared with 0.15 for the control. The results shows a new area for application of FFSL in human diets. AA

93 CHANDRA SHEKARA (S), HARIDAS RAO (P) and SHURPALEKAR (SR). Studies on the consistency of biscuit doughs using "Research" water absorption meter. **J. Food Sci. Technol. (India) 23**(4); 1986; 208-12

Extrusion time of dough for biscuit has been measured using the 'Research' water absorption meter (RWAM) by changing the process variables like level of water (14-20%), mixing period (3-15 min), level of shortening (12-36%), level of sugar (13.5-40.5%); the last two being tried individually and in combination. The laboratory trials have indicated that RWAM extrusion time can serve as reliable index for predicting the overall quality of soft doughs. The extrusion time for the conventional soft doughs was 50 to 100 s as shown by RWAM. Resting the dough upto 3 h increased the extrusion time from 58 to 99 s and beyond 3 h reduced the consistency; 90 min resting was found optimum. Increase in added water from 15 to 20% decreased extrusion time; 17% water gave excellent biscuits. 3-4 min mixing gave stiff, inconsistent lumpy dough with high extrusion time (121 to 161 s). 5-7 min mixing gave excellent quality biscuits. Use of shortening at 36% level extruded ready in 15 s. Increasing the sugar level from 13.5 to 40.5% increased the spread from 5.07 to 5.67 cm as well as spread factor from 83 to 121. Combined study with sugar and shortening indicated that by increasing sugar by 2% in the formulations, shortening could be reduced by 3%. Excellent biscuits are obtained when shortening and sugar were at 24 and 27% resp. KAR

94 MAJUMDAR (TK). Cost concept in biscuit industry. **Bev. Food World. 13**(1); 1986; 23-6

Bread

95 LIN (JC-M), CHASTAIN (MF) and STRENGTH (DR). Sensory and nutritional evaluation of wheat bread supplemented with single cell protein from torula yeast (**Candida utilis**). **J. Food Sci. 51**(3); 1986; 647-51

Experimental breads were made with 2, 4, 6, 8, 10, and 12% torula yeast flour (TYF). Taste panels found that bread fortified with 8% TYF was acceptable. Eight per cent TYF raised protein content from 12.42% for all wheat flour bread to 14.22% for supplemented bread. Amino acid analyses indicated a marked increase in amino acid content especially lysine. The protein efficiency ratio (PER) for rats on all-wheat-flour bread was 1.31; replacing 8% of the wheat flour with TYF raised PER of supplemented bread to 2.28. Total carcass nitrogen retained by animals fed a diet containing supplemented bread was higher than that retained by rats whose protein was obtained from unsupplemented bread. AA

96 MACRI (LJ), BALLANCE (GM) and LARTER (EN). Factors affecting the breadmaking potential of four secondary hexaploid triticales. **Cereal Chem. 63**(3); 1986; 263-7

97 POMERANZ (Y) and MEYER (D). Light and scanning electron microscopy of wheat- and rye-bread crumb. Interpretation of specimens prepared by various methods. **Getreide Mehl Brot. 40**(3); 1986; 81-4 (De)

For investigations with the light microscope, it is advisable to prepare frozen sections of the crumb. This treatment is also suitable for electron microscopy of crumb samples, with rupture surfaces of different kinds, from which starch had been dissolved out. When fresh crumb samples are freeze-dried and examined with the electron microscope, the structure of the starch and the matrix is retained, so that the degree of deformation of the gelatinized starch granules, and their embedding in the matrix, could be well recognized. These samples also revealed the distribution of components within the pore walls, as well as the presence of micro-pores. KMD

98 ROGNERUD (G), WILSHER (B), OYBO (AM) and FROLICH (W). Sensory and nutritional properties in one variety of Norwegian whole grain bread. **Cereal Chem. 63**(3); 1986; 207-9

Considerable variation was found in iron and dietary fibre content in Kheipp bread (from 24 bakeries) prepared from the Norwegian variety of wheat. Results also showed that whole grain flour content in Kheipp bread increased over the past five years. Sensory properties were correlated to dietary fibre content of bread. Significant correlation was observed between fibre, impression crust and crumb, texture of crust and flavour. BSN

99 TAHA (FS), HAMOUDA (AA) and SHEHATA (NA). Nutritional evaluation of bread fortified with peanut protein products. **Getreide Mehl Brot. 40**(3); 1986; 91-3 (De)

Groundnut flour (at 5% or 10% level), groundnut protein conc. (at 5% level) and groundnut protein isolate (at 5% level) were added to wheat flour to make a high protein bread. The bread was then fed to chickens to assess its nutritional value. The best rate of growth was achieved with bread containing either 5% of groundnut flour, or 5% of groundnut protein isolate. Fortification with 10% groundnut flour or with 5% groundnut protein conc. did not produce as good results as those mentioned above. Thus, it is recommended that 5% groundnut flour should be added to a wheat flour of 85% extraction when making bread. KMD

Cakes

100 BERGLUND (PT) and HERTSGAARD (DM). Use of vegetable oils at reduced levels in cake, pie crust, cookies, and muffins. **J. Food Sci. 51**(3); 1986; 640-44

Sensory acceptability and physical characteristics of yellow cake, pie crust, drop sugar cookies and muffins prepared with reduced levels of oils (soybean and safflower) of intermediate and high polyunsaturated/saturated fatty acid (P/S) ratio and a standard level of hydrogenated vegetable shortening were evaluated. Both types and all levels of oil compared satisfactorily with vegetable shortening in both cake and pie crust for all sensory characteristics judged. Drop sugar cookies made from oils were similar in flavour to those made with shortening, but were less liked for appearance, crispness and overall preference. Muffins prepared with the oils were preferred over the shortening for appearance but there were no definite trends in preference for other characteristics. AA

101 MARTIN (ML) and DAVIS (AB). Effect of soy flour on fat absorption by cake donuts. **Cereal Chem. 63**(3); 1986; 252-5

Protein dispersibility index (PDI) of cake donut formulas added with soy flour did not serve as a good indicator of soy functionality for this application. Above 50 PDI level the quantity of soy flour added acted as the best predictor of fat absorption control. In reducing fat absorption, soy protein losses its functonality at a PDI level of 30. BSN

Dough

102 FERNANDEZ DE TONELLA (ML) and YEPIZ (MS). Effects of lysine and methionine fortification on dough and bread characteristics. **J. Food Sci.**

51(3); 1986; 637-9, 644

Wheat flour from the Hermosillo Hard Red Spring cv., in Sonora, Mexico was fortified with various levels of lysine and methionine. The effects of added amino acids on the rheological properties were measured by the Brabender Farinograph and the Chopin Alveograph. Nutritional characteristics were measured by Protein Efficiency Ratio (PER). Dough development and stability times were not significantly different between control and fortified flours. Water absorption and Alveograph results indicated differences between samples. PERs were significantly improved by fortification. Overall bread acceptability was not significantly different from unfortified samples. AA

Spaghetti

103 BAHNASSEY (Y), KHAN (K) and HARROLD (R). Fortification of spaghetti with edible legumes. I. Physicochemical, antinutritional, amino acid, and mineral composition. **Cereal Chem.** 63(3); 1986; 210-15

Legume flour was obtained by dry milling nonroasted and roasted seeds of navy bean, pinto bean, and lentil. Protein conc. were extracted from the legume flours by acid precipitation from dilute alkali sol. Fortified spaghetti was prepared from blends of legume flour or protein conc. with a strong gluten durum semolina. Protein, ash, and fiber contents of the fortified spaghetti exceeded the levels for the control spaghetti. Trypsin inhibitor and hemagglutinin activities of legume flours and protein conc. were slightly reduced in the roasted samples. Navy bean contained the highest amount of trypsin inhibitor and hemagglutinin activity followed by Pinto bean and lentil. Legume flours also contained higher levels of both activities than protein conc. The amino acid comp. of spaghetti made with 10 or 15% legume flours or protein conc. showed a better balance of lysine and sulphur amino acids than spaghetti processed from 100% semolina. Mineral content of legume flour, protein conc. and fortified spaghetti was considerably higher than the semolina or control spaghetti. A pronounced shift in higher concn of P, Ca, Fe, Zn and Na into the protein conc. was evident. Roasted samples showed higher levels of Ca, Fe and Zn than the nonroasted samples. AA

104 BAHNASSEY (Y) and KHAN (K). Fortification of spahgetti with edible legumes. II. Rheological, processing, and quality evaluation studies. **Cereal Chem.** 63(3); 1986; 216-9

Spaghetti was prepared from durum wheat semolina, blended with 3% vital wheat gluten, and fortified with 0, 5, 10, 15, 20, and 25% of nonroasted or roasted navy, pinto, or lentil flours or their protein conc. to increae protein quantity. Supplementing semolina with legume flours or protein conc. caused an increase infarinograph water absorption, except for blends containing 25% of the nonroasted and roasted pinto bean flour, in which a slight decrease was noticed. Dough development time and stability was higher for blends containing navy or pinto bean flours. A decrease in the mechanical tolerance index was obtained for blends containing different levels of navy or pinto bean flour or protein conc. Cooking loss of fortified spaghetti was higher as the level of substitution increased and higher for spaghetti containing protein conc. than for spaghetti containing legume flours. Firmness scores of the fortified spaghetti increased with the level of fortification. Taste panel evaluation showed that spaghetti supplemented with up to 10% of legume flours or protein conc. was acceptable for all the parameters tested. All panel members showed preference for spaghetti containing legume flours over the spaghetti containing legume protein conc. However, spaghetti containing 10% protein conc. was also acceptable. Spaghetti made from roasted samples was preferred over nonroasted samples. A beany taste was reported for spaghetti containing 25% of nonroasted legume flours or their protein conc. AA

MILK AND DAIRY PRODUCTS

Milk

105 BUCKY (AR), HAYES (PR) and ROBINSON (DS). Lipase production by a strain of **Pseudomonas fluorescens** in whole milk and skimmed milk. **Food Microbiol. 3**(1); 1986; 37-44

Maximum lipase activity in skimmed milk was c. x 10 that in whole milk during culturing of **Pseudomonas fluorescens** strain 34 at 10° C. Reduction in culturing temp. from 25-4 C progressively increased lipase production in whole milk. Agitation of whole milk cultures caused lipase production profiles to be shifted towards earlier stages of logarithmic growth when compared to cultures incubated statically. Lipase production was depressed in skimmed milk when triolein or a mixture of free fatty acids (FFA) were added. Lipase in whole milk cultures demonstrated non-linear thermal deactivation kinetics during heat treatments at 71.5°C. AA

106 ISHWAR SINGH and POONAM. Determination of zinc in milk samples using 1-(2-quinolylazo)-2,4,5-trihydroxybenzene as spectrophotometric reagent. **J. Indian Chem. Soc. 63**(2); 1986; 259-60

Preparation of a 1 x 10^{-3} M solution of the reagent 1-(2-quinolyl)-2,4,5-trihydroxybenzene (QATB) has been described. A fresh standardized solution of zinc sulphate (1%) was also prepared. A suitable vol. of the Zn solution (containing 2.8-9.0 µg Zn) was treated with 0.5 ml of 1% ascorbic acid solution, and 1 ml of the 1 x 10^{-3} QATB solution; to this was added 2 ml of 0.5 N NaOH solution, and the mixture diluted to 10 ml, keeping the final concn. of ethanol at 40% (v/v). A dark brown colour was formed and the absorbance was measured at 560 nm against a reagent blank. A calibration curve was then drawn. The method is simple, rapid, and highly sensitive as well as selective for Zn.

Cheese

107 CHEN (HC) and ZALL (RR). Evaluation of thiol activated proteases from clam viscera as a rennet substitute for cheese-making. **J. Food Sci. 51**(3); 1986; 815-20, 825

The possibility of using cathepsin B-like protease from clam viscera as a rennet substitute was investigated. Clam rennet was more proteolytic and produced softer curd as compared porcine pepsin and calf rennet. Influences of pH and temp. on milk clotting with clam rennet were very similar to calf rennet. The cheddar cheese made with clam rennet was similar to that made with calf rennet inspite of its high ratio of proteolytic clotting activity; this activity appeared to accelerate the ripening process. However, excessive proteolysis during cheese making caused a small yield loss. MVG

108 KANTEREWICZ (RJ) and CHIRIFE (J). Colour changes and available lysine during storage of shelf-stable concentrated cheese whey. **J. Food Sci. 51**(3); 1986; 826-8

Conc. whey (about 50% solids) was stabilized against microbial deterioration by a combination of a slight reduction of water activity (a_w) (0.94 or 0.92), lowered pH (5.2 or 5.4) and addition of 0.2% potassium sorbate. Colour changes and available lysine loss in the above shelf stable whey, stored at different temp. were studied. A zero order reaction kinetics was observed for colour changes during browning of the conc. whey; activation energy was found to be 26 kcal/mole. The loss of available lysine amounted to 20-30% of the initial value after three months of storage at 30°C. AA

109 KHALID (AS) and HARRIGAN (WF). The effect of desalting Sudanese cheese on growth of and toxin production by **Staphylococcus aureus** 196 E. **J. Food Sci. Technol. (India) 23**(4); 1986; 243-5

Sudanese white cheese prepared from salted (8% w/v) milk inoculated with **Staphylococcus aureus** 196 E (toxin A and D producer) plus rennet tablets was packed in whey and stored for a wk at 37 C. **Stap. aureus** count, general viable count, pH, NaCl, and water activity (aw) and the presence of enterotoxin A and D were determined in cheese after 7 days of storage in whey and as also in **Staph. aureus** free tap water at 37 C. After 7 days storage in whey all the factors mentioned above decreased except % NaCl which increased from 7.4 to 8.1%. Steeping in sterile tap water for 7 days increased the general count, decreased pH, and NaCl, but increased a_w. **Staph. aureus** increased to the level of toxin production (8.3×10^7) after 7 days in water steeped cheese; only enterotoxin A **was** detected in steeped sample while enterotoxin D was absent. KAR

110 STANCHER (B) and ZONTA (F). High performance liquid chromatographic analysis of riboflavin (vitamin B2) with visible absorbance detection in Italian cheeses. **J. Food Sci. 51**(3); 1986; 857-8

Ghee

111 NINA ARORA and KANSAL (VK). Some toxicological aspects of casein and ghee prepared from spoilt milk. **J. Food Sci. Technol. (India) 23**(4); 1986; 213-6

Ghee and casein obtained from spoilt milk were toxicologically evaluated by rat feeding experiments. The spoilt milk collected from Karnal (India) market showed **Staphylococcus aureus** and **Escherichia coli** population of 12×10^4 and 10×10^4 counts/ml resp. and no enterotoxin was found in the former and in the latter inflammation was observed in the mice intestine after intragastric injection. No heat-stable toxin could be detected in spoilt milk till initiation of curdling. Casein from milk with 0.2, 0.3 and 0.4% acidity and ghee from milk with 0.5% acidity was fed after neutralization with sodium bicarbonate and ghee prepared from direct churning of curdled milk were fed for 6 months to rats. Feeding ghee prepared by direct churning of curdled milk to rats showed no adverse effect on the growth and organs of rats. Ghee made from neutralized curdled milk or milk with 0.5% acidity, and casein prepared from milk with 0.2, 0.3 and 0.4% acidity promoted lower growth rate than the controls. Inflammation of oviduct was observed in 40% of rats fed ghee made from neutralized curdled milk or 0.5% acidity milk, and in 10 and 40% of rats fed casein from 0.3 and 0.4% acidity milk resp. The growth rate and haemoglobin level in rats fed casein from 0.2% acidity milk were similar to control rats. The wt. gain was significantly lower in rats fed casein from 0.3 or 0.4% acidity milk. The haemoglobin level was also lower in rats fed casein from 0.4% acidity milk. No abnormality was observed in rats fed ghee prepared by direct churning of spoilt milk while the intake of ghee prepared from spoilt milk after neutralization caused dimunition in growth rate, haemoglobin level and the wt. of gastro intestinal tract and in the inflammation of oviduct. KAR

Whey

112 AIYAR (KR), GREIG (RIW) and SANGROUBER (M). Nitrogen determinatin of commercially prepared lactalbumin. **J. Food Sci. 51**(3); 1986; 856, 858

Commercially produced denatured whey protein (lactalbumin) was analysed for total protein using the macro-Kjeldahl technique. The effect of catalyst ($CuSO_4$.HgO) and preincubation on total nitrogen was determined. Results showed that HgO gave consistently higher and more reproducible results than $CuSO_4$. Preincubating the sample in conc.

H_2SO_4 for 24 h prior to digestion improved the recovery of nitrogen. AA

MEAT AND POULTRY

Meat

113 KURTH (LB). Effect of pressure-heat treatments on cathepsin B1 activity. **J. Food Sci. 51**(3); 1986; 663-4, 667

The substrate Nα-benzoyl-DL-arginine-2-naphthylamide was used to measure the activity of crude cathepsin B1 in reaction mixtures that had been subjected to various combined pressure and heat treatments. Pressures of 100 kPa (atm.), 100 MPa and 150 MPa and temp. in the range 30-80°C were used. High pressure appeared to protect the enzyme against heat inactivation. Max. activity was observed at 60°C and 150 MPa and was 12 times that observed at 60°C and atm. pressure. An increase in activity of cathepsin B1 may account, at least in part, for the tenderization of meat by pressure-heat treatments. AA

114 LORD (DW) and SWAN (KJ). Determination of hydroxyproline in meat products: Collaborative trial. **J. Assoc. Pub. Anal. 24**(2); 1986; 69-72

115 MACFARLANE (JJ), TURNER (RH) and JONES (PN). Binding of meat pieces: Influence of some processing factors on binding strength and cooking losses. **J. Food Sci. 51**(3); 1986; 736-41

116 SEN (NP), BADDOO (PA) and SEAMAN (SW). N-nitrosothiazolidine and N-nitrosothiazolidine-4-carboxylic acid in smoked meats and fish. **J. Food Sci. 51**(3); 1986; 821-5

117 YOUNG (RB), MORIARITY (DM) and McGEE (CE). Structural analysis of myosin genes using recombinant DNA techniques. **J. Anim. Sci. 63**(1); 1986; 259-68

Beef

118 BEILKEN (SL), BOUTON (PE) and HARRIS (PV). Some effects on the mechanical properties of meat produced by cooking at temperatures between 50 and 60 C. **J. Food Sci. 51**(3); 1986; 791-6

119 KIM (H) and SHELEF (LA). Characterization and identification of raw beef, pork, chicken and turkey meats by electrophoretic patterns of their sarcoplasmic proteins. **J. Food Sci.** 51(3); 1986; 731-5, 741

The study was made using thin layer agarose gel electrophoresis; creatine kinase isoenzyme MM and myoglobin bands were used to identify the mixtures. Binary mixtures (5/95, 25/75, 50/50, 75/25, 95/5 % by w of each species) were also examined by their electrophoretic and densitometric patterns. At elevated pH (7.5), the electrophoretic pattern remained stable, but low pH (4.7) affected them. The relative ratios of bands characterising each species changed in proportion to the species content in each binary mixture. These ratios helped prediction of the approx. fraction of each species present in these mixtures. MVG

120 MILLER (MF), DAVIS (GW), WILLIAMS (AC) Jr., RAMSEY (CB) and GALYEAN (RD). Effect of fat source and colour of lean on acceptability of beef/pork patties. **J. Food Sci. 51**(3); 1986; 832-3

Bovines

121 BERNAL (VM) and STANLEY (DW). Changes in the melting characteristics of bovine tendon collagen induced by a bacterial collagenase. **J. Food Sci. 51**(3); 1986; 834-5, 837

122 HAYAKAWA (S), MATSUURA (Y), NAKAMURA (R) and SATO (Y). Effect of heat treatment on preparation of colourless globin from bovine hemoglobin using soluble carboxymethyl cellulose. **J. Food Sci. 51**(3); 1986; 786-90, 796

123 YU (LP) and LEE (YB). Effects of postmortem pH and temperature on bovine muscle structure and meat tenderness. **J. Food Sci. 51**(3); 1986; 774-80

124 ZEECE (MG), KATOH (K), ROBSON (RM) and PARRISH (FC) Jr. Effect of cathepsin D on bovine myofibrils under different conditions of pH and temperature. **J. Food Sci. 51**(3); 1986; 769-73, 780

125 ZEECE (MG), ROBSON (RM), LUSBY (ML) and PARRISH (FC) Jr. Effect of calcium activated protease (CAF) on bovine myofibrils under different conditions of pH and temperature. **J. Food Sci. 51**(3); 1986; 797-803

Bulls

126 DIKEMAN (ME), REDDY (GB), ARTHAUD (VH), TUMA (HJ), KOCH (RM), MANDIGO (RW) and AXE (JB). Longissimus muscle quality, palatability and connective tissue histological characteristics of bulls and steers fed different energy levels and slaughtered at four ages. **J. Anim. Sci. 63**(1); 1986; 92-101

Cow

127 PHOYA (RKD) and WILL (PA). The influence of hot-boning and delay chilling on tenderness of mature cow carcasses hung by the obturator foramen. **J. Food Qual. 9**(2); 1986; 67-75

Pork

128 FJELKNER-MODIG (S) and PERSSON (J). Carcass properties as related to sensory properties of pork. **J. Anim. Sci. 63**(1); 1986; 102-13

Rearing, carcass and meat-quality traits of samples from purebred Hampshire (n = 58), Swedish Landrace (n = 30) and Swedish Yorkshire (n = 55) pigs were investigated in relation to the sensory properties of **M. longissimus** (ML). Overall the highest live-wt gain, the thinnest backfat, the highest per cent lean in carcass, the highest PSE-frequency (recorded as EEL-colour value) and the lowest intramuscular-lipid content in ML were noted for the Landrace samples. The lowest live-wt gain, the thickest backfat, the lowest per cent lean in carcass, the lowest EEL-colony value and the highest intramuscular-lipid content were noted for the Hampshire samples. The sensory properties of pork were highly affected by breed. Overall, the samples of Hampshire were more juicy and tender than those of the other breeds. The tenderness and juiciness of ML from Landrace could be improved by producing pigs with a higher intramuscular-lipid content and a lower EEL-colour value (i.e. lower PSE-frequency). The sensory properties of Yorkshire could be improved by producing pigs with a higher intramuscular-lipid content and a lower per cent lean in carcass. AA

129 FJELKNER-MODIG (S). Sensory properties of pork, as influenced by cooking temperature and breed. **J. Food Qual. 9**(2); 1986; 89-105

Samples of **M. longissimus** dorsi were taken from identically reared pure bred pigs of the Hampshire ($n = 50$), Swedish Landrace ($n = 30$) and Swedish Yorkshire ($n = 51$) breeds and sensory evaluated after being fried to 60, 68 and 80°C. A sensory profile comprising three juiciness attributes, i.e., visible juiciness, initial juiciness and dryness in mouth, four tenderness attributes, i.e. hardness, stringyness, chewing time and chewing residual, and the attribute elasticity was developed. The relationship between the different attributes were to some extent influenced by final frying temp. A final frying temp. of 68°C – or even somewhat lower – seems to be the most suitable one from a sensory point of view. The meat is then juicy and tender, no longer having any "rawness" left, as at 60°C. There is a marked influence of breed on the eating quality. A breed difference was also noted in the susceptibility to heating. A higher loss in eating quality was noted for Hampshire Swedish Landrace than for Swedish Yorkshire when the final frying temperature was increased. Hampshire had a somewhat higher frying loss than the other two breeds, but it did not result in the least juicy product which indicates that the sensory property juiciness is not directly correlated to the cooking yield. . AA

130 HONIKEL (KO) and REAGAN (JO). Influence of different chilling conditions on hot-boned pork. **J. Food Sci. 51**(3); 1986; 766-8, 803

The objective of this study was to determine whether cold shortening affects porcine muscles with the intention of evaluating optimum chilling conditions for hot-boned pork. Fast chilling of the porcine **M. longissimus** below 10°C increased purge with little effect on toughness. The fast fall of pH induced by electrical stimulation at prevailing body temp. has been associated with PSE characteristics. Rapid chilling may reduce or prevent this effect. Electrical stimulated/cold-boned loin segments exhibited higher levels of purge than those which were electrical stimulated/hot-boned and chilled rapidly. Cooking losses were not effected by hot-boning or electrical stimulation. AA

131 JONES (SB), STRANGE (ED) and MALEEFF (BE). Ultrastructure of pork liver after freeze-thaw cycling and refrigerated storage. **J. Food Sci.** 51(3); 1986; 761-5

132 WEAKLEY (DF), McKEITH (FK), BECHTEL (PJ), MARTIN (SE) and THOMAS (DL). Effects of different chilling methods on hot processed vacuum packaged pork. **J. Food Sci. 51**(3); 1986; 757-60, 765

Longissimus muscle (loin section) was removed from each side of 24 pork carcasses within 20 min postmortem. Each muscle was divided in half ($N = 96$ sections), vacuum packaged and allotted to one of four treatments: (1) normal chilling, (2) propylene glycol immersion, (3) crust freezing, or (4) high temp. conditioning and four storage intervals ($N = 6$) or 0, 7, 14 or 28 days. Rapid chilling with propylene glycol increased ($P < 0.05$) purge. Shear force values were increased when loins were rapidly chilled ($P < 0.05$) but few sensory differences were observed. Off-odour scores increased ($P < 0.05$) with increasing storage time. Normal chilling resulted in lighter muscle colour scores than rapidly chilled loin sections. Rapid chilling does not have abeneficial effect on palatability or shelf life of hot-processed fresh pork. AA

Bacon

133 DEMPSTER (JF), McGUIRE (L) and HALLS (NA). Effect of gamma radiation on the quality of bacon. **Food Microbiol.** 3(1); 1986; 13-7

Collar bacon was sliced and irradiated with 1.05 KGy to 17.3 KGy radiation treatment. Total bacterial counts were reduced by about 5 log cycles after exposure to 17.3 KGy. No lactic acid bacteria survived 6.3 kGy of radiation. In all cases except for odour, most of the scores were in the excellent category. KAR

134 VECCHIO (AJ), HOTCHKISS (JH) and BISOGNI (CA). N-nitrosamine ingestion from consumer-cooked bacon. **J. Food Sci. 51**(3); 1986; 754-6

Thirty-nine fried bacon samples and corresponding fried-out fats were collected from randomly selected consumers' homes. Bacons were purchased and cooked in the course of preparing meals containing bacon. The average volatile N-nitrosamine content (μg/kg) of the rasher and fried-out fat, resp, were: N-nitrosodimethylamine, 4.0 and 5.3; N-nitrosopiperidine, 0.7 and 1.5; N-nitrosopyrrolidine, 17 and 32; N-nitrosothiazolidine, 8.9 and 3.4. The average daily ingestion of N-nitrosopyrrolidine from bacon for our survey respondents was estimated to be 76 ng/person/day. A majority of respondents indicated that they used the fried-out fat as a cooking oil. AA

Ham

135 FRYE (CB), HAND (LW), CALKINS (CR) and MANDIGO (RW). Reduction or replacement of sodium chloride in a tumbled ham product. **J. Food Sci. 51**(3); 1986; 836-7

Effects of KCl and $MgCl_2$ salts on texture and palatability of a tumbled ham product were investigated. 100% NaCl gave the best overall sensory scores while KCl/NaCl treatment gave best physical bind and acceptable sensory scores. $MgCl_2$ treatment gave the lowest bind and sensory scores. It was concluded that partial replacement of NaCl ionic strength with 50% or less of KCl in tumbled ham can be accomplished while maintaining acceptable sensory and physical attributes. MVG

Chickens

136 McCURDY (SM), JELEN (P), FEDEC (P) and WOOD (DF). Laboratory and pilot scale recovery of protein from mechanically separated chicken residue. **J. Food Sci. 51**(3); 1986; 742-7, 753

Bone residue resulting from mechanical deboning of chicken backs and necks was subjected to alkali extraction followed by acid precipitation to recover food grade protein. A laboratory study of effects of varying die size in the grinding of the starting material, of extraction temp. and of g-force during centrifugation on comp. of process fractions was conducted. Grinding increased ash content, higher temp. reduced fat content, and increasing centrifugal force decreased ash content, of the final products. Effects of grinding, extraction temp. and centrifuge type were also studied on a pilot scale. Final protein product yield was higher at a 22°C than at a 3-7°C extraction temp. and less fat was incorporated using a basket centrifuge than with a horizontal decanter centrifuge. AA

137 OZIMEK (G), JELEN (P), OZIMEK (L), SAUER (W) and McCURDY (SM). A comparison of mechanically separated and alkali extracted chicken protein for functional and nutritional properties. **J. Food Sci. 51**(3); 1986; 748-53

138 SUSHIL KUMAR, WISMER-PEDERSEN (J) and CASPER CASPERSEN. Effect of raw materials, deboning methods and chemical additives on microbial quality of mechanically deboned poultry meat during frozens storage. **J. Food Sci. Technol. (India). 23**(4); 1986; 217-20

Microbial quality of spent hens' whole carcasses, mechanically deboned poultry meat (MDPM) from spent hens' whole carcasses deboned on Beehive deboner at two settings namely 'a' (setting commercially used for deboning chicken racks), and 'b' (setting giving about 10% less yield than 'a') and MDPM from chicken racks such as 'c' (deboned on Beehive deboner) and 'd' (deboned on Protocon MPD-30) were studied. The effects of propyl gallate (50 and 100 ppm) and sodium tripolyphosphate (0.25 and 0.50%) on the shelf life of MDPM during frozen storage at -18 C for 4 months were also studied. The log counts of bacteria present on fresh hens' whole carcasses were, total counts, 5.46; coliforms, 3.43, **Staphylococcus aureus**, 3.48 and faecal **Streptococcus**, 2.00; **Salmonella** was absent. Total count (x log 10/g MDPM) was lowest in 'b' (5.15) followed by 6.46 for 'd', 7.30 and 7.30 for 'a' and 'c' resp. The coliforms, **Staph. aureus**, faecal **Streptococcus** and **Clostridium** (x log 10/g MDPM) were 4.30, < 2.00, 3.90 and 4.11 in 'a', 4.40, < 2.00, 3.78 and 4.04, in 'b', 4.27, < 2.00, 4.52, and <1.00 in 'c' and 4.45, <2.00, 4.78 and nil in 'd'. **Salmonella** was absent in all groups. Freezing reduced the bacterial counts (total coliforms and haemolytic) in all the MDPM groups. Propyl gallate and sodium tripolyphosphate showed little improvements in shelf life of MDPM group during frozen storage. KAR

SEAFOODS

Fish

39 LANE (RH), ABDEL-GHANY (M) and JONES (SW). Viscosity and pickup of a fish and chip batter: Determinants of variation. **J. Food Qual. 9**(2); 1986; 107-13

Relationship between viscosity and pickup (per cent coating wt.) of a fish and chip batter was examined with respect to the following parameters: (1) protein content of wheat flour used, (2) batter temp. and (3) batter holding time. Results obtained indicated that a statistically significant ($P \leq 0.001$) correlation existed between viscosity and: (1) wheat flour protein content ($r = 0.96$), (2) per cent pickup ($r = 0.90$), and (3) batter temp. ($r = -0.62$). Results also indicated that protein content of the wheat flour ingredient and batter temp. may be used as indicators of batter viscosity and, subsequently, per cent pickup in the operation of battering portion-controlled codfish fillets. AA

Bomby duck

40 RAJEDRA BADONIA. Review on processing of Bombay Duck. **Seafood Exp. J. 18**(10); 1986; 9-12

Aspects covered in this review include, methods of fishing; processing methods covering the traditional sun-drying and modern methods of freezing and canning; and packing and marketing of the dried fish. KMD

Otolithus argenteus

41 RAMANDA RAO (D). Salted and dried **Otolithus argenteus**. **Bev. Food World. 13**(1); 1986; 11-16, 22

By drying **Otolithus argenteus** fish in an artificial drier (kiln) by phase drying at 40°C during initial 10 hours and later at 50 C a good quality product may be obtained. BSN

Salmon

42 SKREDE (G) and STOREBAKKEN (T). Characteristics of colour in raw, baked and smoked wild and pen-reared Atlantic salmon. **J. Food Sci. 51**(3); 1986; 804-8

Colour of wild, astaxanthin pigmented, and farmed, canthaxanthin pigmented. Atlantic salmon (**Salmo salar**) was evaluated by spectroscopy and visual sensory analyses. A more yellow hue in farmed salmon colour compared with wild salmon was found in acetone extracts of raw salmon flesh and by visual sensory analyses of raw, baked and smoked salmon flesh. With instrumental colour analysis directly on raw flesh, no significant differences in colour between wild and farmed salmon were found. The redness and hue in raw and baked salmon flesh and the redness in smoked salmon were correlated to the pigment concn. in raw salmon. The redness and hue in processed salmon were predictable from th redness and hue of raw flesh. AA

Cuttlefish

143 SHAJY ZACHARIA. A study on the use of water treated with ultra violet rays in the processing of individually quick frozen cuttlefish fillets. **Seafood Exp. J. 18**(10); 1986; 5-8

In Japan, cuttlefish is consumed raw as "sashmi" and the bacterial load should be very low. The author has tried to sterilize the water used for cuttlefish processing by UV rays. UV treatment of water lowered the bacterial count from 1030/ml to 28/ml at 37°C. Total plate count reduced from 34,000 to 18,300/g when UV treated water was used for processing and coliforms were reduced from 52 to 7 counts/g. KMD

Mussels

144 ABLETT (RF) and GOULD (SP). Comparison of the sensory quality and oxidative rancidity status of frozen-cooked mussels (**Mytilus edulis** L.). **J. Food Sci. 51**(3); 1986; 809-11

Shrimps

145 PAPADOPOULOS (LS) and FINNE (G). Effect of environmental salinity on sensory characteristics of penaeid shrimp. **J. Food Sci. 51**(3); 1986; 812-4

White shrimps were held at 10, 30 and 50 ppt salinities, evaluated for flavour by a trained sensory panel and analyses for time moisture, chloride, free amino acid concn. and free amino acid profile. Triangle tests showed significant differences in flavour between shrimp held at 10 and 50 ppt and 30 and 50 ppt but not between 10 and 30 ppt. The free amino acid concn. (wet wt basis) was 81% higher in shrimp held at 50 ppt as compared to those held at 10 ppt and 63% between those held at 50 ppt as comapred to 30 ppt. However, only 11% difference was found between shrimp held at 30 ppt as compared to those held at 10 ppt. The difference in flavour intensity in shrimp held at different salinities appeared to be a direct reflection of the concn. of tissue free amino acids which serve as osmoregulators in shrimp tissue. MVG

PROTEIN FOODS

146 SCARLETT-KRANZ (JM), SHANE (BS), MCCRACKEN (KE), BACHE (CA), LITTMAN (CB) and LISK (DJ). Survey of nitrate, cadmium and selenium in baby foods - health considerations. **J. Food Safety. 8**(1); 1986; 35-45

An analytical survey was conducted of the nitrate, Cd and Se content of baby foods containing fruits, vegetables or meats. Those containing greenbeans, beets, carrots, spinach, squash and mixed vegetables were notably higher in nitrate ranging up to 5228 ppm (dry wt) in squash. Among the vegetables, beets, carrots and spinach were highest in Cd, with carrots containing 2467 ppb. Se was consistently higher in meats and vegetables. Fruit-containing baby foods were lowest in all three constituents measured. AA

FRUIT JUICES AND BEVERAGES

7 AGARWAL (SKD). Quality requirements of caramel for beverages, pharmaceuticals and allied products. **Bev. Food World.** 13(1); 1986; 39-40

48 EDINGER (WD) and SPLITTSTOESSER (DF). Production by lactic acid bacteria of sorbic alcohol, the precursor of the geranium odour compound. **Am. J. Enol. Vitic.** 37(1); 1986; 34-8

Twenty-eight strains of **Leuconostoc**, **Lactobacillus**, and **Pediococcus** species were grown in media containing sorbate. All 19 of the leuconostocs produced sorbic alcohol, the precursor of the compound responsible for the so-called geranium odour, while none of the other types did so. Although no sorbic aldehyde was detected, it was postulated that the strains capable of degrading sorbic acid possessed an aldehyde dehydrogenase that the others lacked. However, the ability to reduce sorbic aldehyde was not the deciding reaction. Results indicated that this latter reaction was carried out by all of the strains of lactic acid bacteria tested as well as by commercial alcohol dehydrogenase from yeast. AA

49 ASHA JAVALAGI (M) and VAIDEHI (MP). Protein and energy content of acceptable beverages prepared with blends of soya (D.F.) skim milk, sesame, coconut and malts from wheat, ragi and green gram. **Bev. Food World.** **13**(1); 1986; 35, 36, 38

Data generated have shown that among beverages investigated, wheat malt blend and soya with coconut and skim milk blends were found to be the best acceptable beverages, as they possessed high protein and energy contents. BSN

Apple juices

50 BABSKY (NE), TORIBIO (JL) and LOZANO (JE). Influence of storage on the composition of clarified apple juice concentrate. **J. Food Sci. 51**(3); 1986; 564-7

The effect of storage on apple juice conc. was determined by following changes in comp. during a period of 111 days at 37 C. Results showed that storage caused an 87% loss in the total free amino acids, which was mostly due to decreases in glutamic acid, asparagine and aspartic acid. The formol titration method was inadequate for determining the amino compounds involved in Maillard-type reactions. Sucrose was hydrolyzed under these conditions at a rate corresponding to a first order process. The reducing sugars increased at a rate determined by the inversion of sucrose; no consumption attributable to browning reaction was detected. Reduction of organic acids was 9% while apparent phenolic compounds increased from 0.149 to 0.215 g/100g. A max. accumulation of HMF was observed after 100 days of storage. AA

51 THOMAS (RL), WESTFALL (PH), LOUVIERI (ZA) and ELLIS (ND). Production of apple juice by single pass metallic membrane ultrafiltration. **J. Food Sci. 51**(3); 1986; 559-63

Citrus juices

52 URMIL MEHTA, SINGH (CM) and BAJAJ (S). A study on refreshing quality of citrus drinks for atheletes. **Bev. Food World. 13**(1); 1986; 41-6

Grapefruit juices

153 STEIN (ER), BROWN (HE) and CRUSE (RR). Seasonal and storage effects on colour of red-fleshed grapefruit juice. **J. Food Sci. 51**(3); 1986; 574-6, 587

Orange juices

154 LEE (HS), ROUSEFF (RL) and FISHER (JF). Determination of food preservatives in orange juice by reversed-phase liquid chromatography. **J. Food Sci. 51**(3); 1986; 568-70

The HPLC system developed to determine benzoic acid, sorbic acid and methyl and propyl esters of p-hydroxybenozoic acid (parabens) in orange juice, consists of a reversed phase column (150 x 6.0 mm i.d.) packed with a rigid polystyrene - divinylbenzene gel, a solvent system of acetonitrile-0.05 M KH_2PO_4 (40:60) with flow rate of 1.0 ml/min and 230 nm detection. The system allows for complete detn. including preparation of the sample in 30 min. It was possible to recovery 93% or more of all preservatives except high concn. (500 p.p.m) of parabens. MVG

155 MIJARES (RM), PARK (GL), NELSON (DB) and McIVER (RC). HPLC analysis of HMF in orange juice. **J. Food Sci. 51**(3); 1986; 843-4

An HPLC method for determining HMF (5-hydroxymethylfurfural) in orange juice has been developed. The method for HMF involves extraction of the juice with ethyl acetate prior to reverse-phase HPLC. Fortification studies indicate an average recovery of 96.1% ± 4.1% and a detection limit of 5.0 p.p.b. AA

Passion fruit juices

156 YU (ZR), CHIANG (BH) and HWANG (LS). Retention of passion fruit juice compounds by ultrafiltration. **J. Food Sci. 51**(3); 1986; 841-2, 844

Recovery of passion fruit juice compounds by ultrafiltration was studied using a tubular system equipped with a 25,000 dalton nominal M.W. cut-off membrane. The retentivities of many important flavour compouds, such as β-ionone, ethyl hexanoate, hexyl butyrate and hexyl hexanoate, were 80% or higher when operating at 20°C and 12 bar of pressure. Retentivities of sugars and organic acids were between 10 to 40%. The retentivities increased as the concn. ratio increased. AA

Coffee

157 MALAVE-LOPEZ (J) and PELEG (M). Mechanical attrition rate measurements in agglomerated instant coffee. **J. Food Sci. 51**(3); 1986; 687-90, 697

Various size fractions of commercial agglomerated instant coffee were subjected to vertical and horizontal vibration at various frequencies. The resulting size reduction and its rate are described mathematically by a three parameter, two term, exponential decay model and a two parameter, nonexponential, model. The constants of these models were used to quantify the effects of particle size, vibration frequency and filling ratio on the agglomerates' attrition rate. The two models, despite their different mathematical structure, yielded a consistent account of the attrition kinetics. AA

158 MALAVE-LOPEZ (J) and PELEG (M). Patterns of size distribution changes during the attrition of instant coffees. **J. Food Sci. 51**(3); 1986; 691-4, 702

Instant agglomerated and freeze-dried coffee particles of uniform size were subjected to mechanical attrition through horizontal and vertical vibration, and drop tests. The particle size distributions that resulted and their change with the time in vibration or number of drops were recorded. The results are interpreted in light of the relative roles of two breakage mechanisms, namely fines generation through surface erosion, and particle shattering that produces remnants of a much larger size. AA

59 REIS (FDeAM), LIMA (CAS), PESSOA (OF) Jr., VARGAS (H), CORTEZ (JG) and AZEVEDO (AMG). Water-soluble components in coffee beans: Photoacoustic assessment. **J. Food Sci. 51**(3); 1986; 849, 851

Photoacoustic spectroscopy offers a possible nondestructive alternative for **in situ** assessment of water-soluble compounds in green or roasted coffee beans. Its relevance to fast, routine evaluation of coffee beans is discussed. AA

60 WHITBY (KE), COLLINS (TFX), WELSH (JJ), BLACK (TN), O'DONNELL (M), GRAY (GC), GREEN (S) and WEST (WL). Reproduction study of caffeine administration to male Osborne-Mendel rats. **Food Chem. Toxicol. 24**(4); 1986; 277-82

The potential for caffeine, administered twice daily by gavage in a total dose of 40 or 80 mg/kg/day, to adversely affect the reproductive performance of male rats was investigated. Treatment was continued through 3 wk of serial mating; mating and dosing were terminated concurrently, after which the sires were autopsied and their testes weighed. Controls were treated similarly with distilled water. Significant dose-related differences were detected for sire body wt., but not for testes wt. The majority of the significant effects on the offspring were for those born to the low-dose sires. Statistically significant differences were sporadically detected for the number of pups born and their body wt.s and survival; however, these differences were not consistently detected in either a dose- or temporal-related fashion. Thus, caffeine appears to have little potential to produce adverse reproductive effects when administered by gavage to male rats at the levels tested in this study. AA

Alcohols

161 ANON. Alcohols. **Br. Food J. 88**(932), 1986, 65-6

Covers derivation; food applications; uses and effects; sampling and regulation control and alcohol flavouring. BV

Beer

162 BAMFORTH (CW). Beer flavour stability. **Bev. Food World. 13**(1); 1986; 18-22

Discusses: Flavour deterioration; sources of nonenal in beer; role of O_2; role of lipoxidase in causing flavour deterioration; superoxide dismutase; prediction of beer flavour stability; role of superoxide dismutase in preventing deterioration in beer; measurement of liquid peroxides and carbonyl staling substances; and production of staling substances during pasteurization. BSN

Hops

163 BAKSHI (SK), JOSHI (PN), KITCHLOO (SK) and ATAL (CK). Changing facets of World hop industry. **Bev. Food World.** 13(1); 1986; 30-34

Wines

164 KERN (H). A photometric determination of sulphate in wine. **Dtsch. Lebensmittel-Rundschau. 82**(9); 1986; 297-8 (De)

Sulphate in wine is quantitatively precipitated with a well-defined quantity of barium chloride; then the barium that remained in the analysing sample is detn. photometrically by means of the chelate-forming Sulfonazo III. This indirect photometrical method is furnishing analysis values that are well in conformance with those obtained through the official analysing method in use. AA

165 MORA (SJde), ESCHENBRUCH (R), KNOWLES (SJ) and SPEDDING (DJ). The formation of dimethyl sulphide during fermentation using a wine yeast. **Food Microbiol. 3**(1); 1986; 27-32

The evolution of sulphur gases, especially dimethyl sulphide (DMS), was investigated during wine production. Fermentations were carried out in a mineral medium inoculated with **Saccharomyces cerevisiae** R92 and supplemented with a range of sulphur compounds. No volatile sulphur components were emitted following sulphate or sulphite additions. Methionine or cysteine supplements led to the evolution of methyl mercaptan and dimethyl sulphide. The cysteine to DMS pathway was confirmed using S-35 radiolabelled cysteine. In all cases, the volatile components were generated from yeast slurries after racking. The mechanism responsible may involve the autolysis of yeast. AA

166 NYKANEN (L). Formation and occurrence of flavour compounds in wine and distilled alcoholic beverages. **Am. J. Enol. Vitic. 37**(1); 1986; 84-96

The most probable mechanisms involved in the formation of carbonyl compounds, fusel alcohols, fatty acid esters, and free fatty acids by yeast in fermentation are discussed. Isopentyl alcohol, phenethyl alcohol, and their acetates in addition to the ethyl esters from hexanoate to laurate formed by different yeasts in sugar fermentation were determined. The bivariate distributions of the concn. indicate that the mutual relationships of the compounds depend significantly on the yeast used and on the capacity of the yeast to produce alcohols and esters. The wine yeast used in this work produced smaller amounts of ethyl esters of fatty acids from acetic acid to octanoic acid under aerobic fermentation conditions than under strictly anaerobic conditions; on the other hand, ethyl laurate and ethyl 9-hexadecenoate were formed more abundantly in anaerobic conditions. Furthermore, qualitatively-similar flavour comp. were obtained in a Spanish sherry and a Finnish berry wine of sherry type. Hence, the formation of the most dominant compounds occurring in beverages depend more on the yeast selected than the raw materials used in fermentation. AA

167 OSZMIANSKI (J), ROMEYER (FM), SAPIS (JC) and MACHEIX (JJ). Grape seed phenolics: Extraction as affected by some conditions occurring during wine processing. **Am. J. Enol. Vitic. 37**(1); 1986; 7-12

OILS AND FATS

Coconut oils

168 McGLONE (OC), CANALES (AL-M) and CARTER (JV). Coconut oil extraction by a new enzymatic process. **J. Food Sci. 51**(3); 1986; 695-7

A new method for coconut oil extraction based on the enzymatic action of polygalacturonases, α-amylase and proteases on a diluted coconut paste was developed. After reaction with enzymes, the solution was centrifuged resulting in three phases; the upper one containing a high quality coconut oil; the middle layer containing water; and the lower phase consisting of coconut meal which has been traditionally used in cattle feed. Eighty % yields were obtained by this method which was advantageous from the energy point of view compared to the traditional process. AA

Groundnut oils

169 WALKER (MJ) and BURNS (DT). Arachis oil: A re-investigation of the Evers test. **J. Assoc. Publ. Anal. 24**(2); 1986; 59-68

The fatty acids which give rise to the turbidity of the Evers test have been identified and the effects of varying their amounts in test sol. have been studied. An amended procedure for the turbidity temp. measurement is recommended. A survey has been made of the turbidity temp. of a number of authentic arachis oils and a new specific lower limit for the turbidity temp. is now proposed. AA

Olive oils

170 RAINA (BL), BHATIA (AK), KATIYAR (SK) and GUPTA (AK). Quality characteristics of promising Himachal olive varieties (**Olea europaea** L.). **J. Food Sci. Technol. (India) 23**(4); 1986; 237-9

Olive var. ((i) Balanquata, (ii) Pendolino, (iii) Coratina, and (iv) Laccino) were evaluated for chem. comp. and their oil for fatty acid comp. The fat content (%) of the mesocarp was 40.0 in (i), 40.60 in (ii), 43.40 in (iii) and 41.00 in (iv) and protein content (%) was 5.13 in (i), 3.88 in (ii), 3.50 in (iii) and 3.75 in (iv). The range of Na, K, Ca and P contents were 42-59, 1360-1700, 127-199 and 72-115 mg/100 g resp. The oil of (i), (iii) and (iv) had linoleic content of 59.0, 49.2 and 49.6% and oleic acid content of 35.5, 39.3, and 36.4% resp. High linoleic (85.1%) and lower oleic acid (10.1%) content was found in (ii). Iodine value ranged from 63.60 to 67.10. The total saturated and unsaturated faty acids content ranged from 0.3 to 8.6 and 91.4 to 99.7% resp. KAR

171 SURINDER KUMAR and GOSWAMI (AK). Evaluation of oil from olives grown in Himachal Pradesh. **J. Food Sci. Technol. (India) 23**(4); 1986; 239-40

Oil from 7 cv. (Ascoiterana, Leccino, Pendulino, Groseena, Cornicobra Attica, Cornicobra and Frantoio) of olive (**Olea europaea**) grown in Solan were evaluated. Oil yield ranged from 11.7 to 40.5%, the highest being in Leccino. Iodine value of oils ranged from 63 to 77 and the free fatty acid (as oleic acid) % from 0.58 to 1.49. Saponification value was higher in Ascoiterana (211.8), Cornicobra Attica (211.8), Frantoio (201.1) and Pendulino (200.4). Unsaponifiable matter ranged from 0.6 to 1.2%. Hehner number of olive oil from all the cv. ranged from 92.8 to 98.2%. These oils are comparable to those of Italy or other olive producing countries. KAR

Soybean oils

172 WARNER (K), FRANKEL (EN), SNYDER (JM) and PORTER (WL). Storage stability of soybean oil-based salad dressings: Effects of antioxidants and hydrogenation. **J. Food Sci. 51**(3); 1986; 703-8

Flavour deterioration of salad dressings was investigated to determined the effect of hydrogenation of the oil, additives and storage conditions. Flavour quality tests were developed and correlated with gas chromatographic analyses of volatile compounds in oil separated from the dressings. Hydrogenation of soybean oil with copper and nickel catalysts effectively increased the storage stability of salad dressings at 21 C but not at 32 C. The use of BHA as antioxidant in the oil or EDTA as a metal inactivator in the starch base as well as nitrogen packaging were effective in prolonging the storage stability of salad dressings made with unhydrogenated soybean oil. Therefore, these additives or N packaging may provide economic substitutes for hydrogenation of soybean oil used in salad dressings. AA

SPICES AND CONDIMENTS

173 SARDAR (PK), HUSSAIN (MH), SRIVASTAVA (D), JACOB (S), DEOTALE (MY) and MATHEW (TV). Isolation and identification of some coal-tar colours in spices by thin layer chromatogaphy. **Res. Ind. 31**(1); 1986; 74-6

A rapid and simple TLC procedure for separating and identifying some coal-tar colours commonly used in spices using alumina (neutral) as the adsorbent and methanol-liquid ammonia (8:2, v/v) as a unique developing solvent is described. The advantage of this method is the bypassing of wool-dyeing clean-up process. This method is rapid, simple, and useful for routine analysis. The colours identified with Rf values are: Rhodamine B 0.93, Metanil yellow 0.87, erythrosine 0.83, Fast Red E 0.71, Carmoisine 0.69, Sunset yellow FCF 0.66, Tartazine 0.46, Ponceau 4R 0.32 and Amaranth, 0.22. KAR

Carum cavi

174 SARDAR (PK), HUSSAIN (MH), SRIVASTAVA (D), JACOB (S) and MATHEW (TV). Thin layer chromatographic differentiation of **Carum carvi** Linn. and **Carum bulbocastanum** Koch by study of their volatile oils. **Res. Ind.** 31(1); 1986; 70-71

A rapid and sensitive TLC method has been developed to differentiate **Carum carvi** and **Carum bulbocastanum.** Dilute sol. of the volatile essential oils collected by steam distillation of the powdered samples are chromatographed on silica gel G plates with benzene-petroleum ether (40-60 C) (1:1, v/v) as the developing solvent system and characteristic spots are visualized by vanillin spray. The method detects the presence of one in the other as low as 1% level.KAR

SENSORY EVALUATION

175 BOYAR (MM) and KILCAST (D). Electromyography as a novel method for examining food texture. **J. Food Sci. 51**(3); 1986; 859-60

176 DERVISOGLU (M) and KOKINI (JL). Steady shear rheology and fluid mechanics of four semi-solid foods. **J. Food Sci. 51**(3); 1986; 541-6, 625

Ketchup, mustard, apple sauce and tomato paste were studied by generating and comparing flow data using cone and plate, parallel plate and capillary measurements over the shear rate range of 0.05-1600 (sec^{-1}). The super imposition of flow data were correlated using power law, Bingham Plastic, Herschel-Bulkley and Casson models were obtained and compared. The most successful were the Bingham Plastic model in the low shear rate range (r = 0.05 - 1.0 sec^{-1}. and the Herschel-Bulkley model in the high shear rate range (r = 1.0 - 1600 (sec^{-1}). Average velocity data comparisons with mathematical prediction using power laws, Herschel-Bulkley and Casson models showed that Herschel-Bulkley model gave the equation and therefore should be used in the design of flow processes for the foods studied. MVG

177 GACULA (MC) Jr. and WASHAM (RW) II. Scaling word anchors for measuring off flavour. **J. Food Qual. 9**(2); 1987; 57-65

A word meaning study was conducted on 43 words and phrases that are useful in the development of an off flavour scale. The equality between category intervals of a commonly used 7-point off flavour scale was also investigated. The result shows that the words and phrases as calibrated by 108 panelists were found to lie on a continuum. Words such as none, absent, etc., for anchoring the lower end of an off flavour scale have very low ambiguity in meaning as measured by the standard deviation, compared towards for anchoring the remaining portion of the scale. The 7-point off flavour scale was found to have unequal interval widths with categories 4, 5, and 6 narrower than the remaining categories. A psychological scale was obtained that can be used for the transformation of sensory data whenever necessary. AA

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

178 MEHTA (VK) and SETHI (GR). Effect of gamma radiation on the larvae of **Trogoderma granarium** Everts. **J. Nuclear Agric. Biol. 15**(1); 1986; 8-12

Larvae of **Trogoderma granarium** is highly resistant to gamma radiation and a dose of 100 krad was required to produce 100% mortality. KAR

BIOCHEMISTRY AND NUTRITION

179 BECKER (HG). Dietary fibre from the consumer's standpoint. **Getreide Mehl Brot. 40**(4); 1986; 122-6 (De)

A survey conducted in the Federal Republic of Germany has brought to light the following facts: (1) About 24% of FRG citizens suffer from constipation, i.e. almost as many as those who are overweight. (2) About 20% of the citizens use laxatives to overcome constipation. (3) Only about 10% of the population are prepared to change their dietary habits to overcome constipation, while 24% refuse to take any therapy for it.(4) Dietary fibre is an entity well known to most people, but only 1 out of 2 persons is favourably inclined towards it. (5) Bread is the dietary item most frequently associated (58%) with dietary fibre, followed by vegetables (40%), other cereal products (38%) and fruit (29%). Whole wheat bread and rye bread are rated as the most suitable sources of dietary fibre, followed at some distance by fruits and vegetables. (6) The sequence of dietary fibre sources tallies with their actual fibre content. (7) In view of the indiscriminate use of laxatives, knowledge about dietary fibre should be made to spread more widely. KMD

TISSUE CULTURE

Nil

TOXICOLOGY AND HYGIENE

180 ANDERSON (D), PHILLIPS (BJ), CHALLIS (BC), HOPKINS (AR), MILLIGAN (JR) and MASSEY (RC). Mutagenic properties of N-nitrosopeptides in mammalian cell culture assays. **Food Chem. Toxicol. 24**(4); 1986; 289-92

Two N-nitrosopeptides, N-(N-acetyl-L-propyl)-N-nitrosoglycine and N-(N-acetylvalyl)-N-nitrosoglycine, were investigated for genetic toxicity towards mammalian cells using an established line of Chinese hamster ovary cells (CHO-K1-BH4). Observations were made on three indices of genetic damage, namely chromosome aberrations, sister chromatid exchange and induction of thioguanine-resistant variants. Treatment of cells with either compound resulted in dose-dependent increases in all indices, indicating that both compounds are direct-acting mutagens. AA

181 BALLINGER (MB), PHILLIPS (TD) and KUBENA (LF). Assessment of the distribution and elimination of ochratoxin A in the pregnant rat. **J. Food Safety. 8**(1); 1986; 11-24

182 GBODI (TA), NWUDE (N), ALIU (YO) and IKEDIOBI (CO). The micoflora and some mycotoxins found in acha (**Digitaria exilis** Stapf) in Plateua State, Nigeria. **Food Chem. Toxicol. 24**(4); 1986; 339-42

Mouldy acha (**Digitaria exilis**) samples were collected at three different periods of the year from some local government areas of Plateau State and were screened for their mycoflora and for seven mycotoxins. **Phoma sorghina** was the most common contaminant during the cold dry harmattan period (November-February) and during the humid and wet period (June-October). This was followed by **Fusarium moniliforme** and then by **Aspergillus** spp. During the hot and dry period (March-May), **Aspergillus** spp. were the most prevalent fungi, followed by **Fusarium** spp. and **Phoma sorghina** in that order. Zearalenone was the most prevalent mycotoxin in mouldy acha samples collected during the cold and dry period, while aflatoxins were the most prevalent in samples collected during the hot and dry period. Zearalenone was only detected in one of the samples collected during the hot, humid and wet period. AA

183 GYONGYOSSY-ISSA (MIC), KHANNA (V) and KHACHATOURIANS (GG). Changes induced by T-2 toxin in the erythrocyte membrane. **Food Chem. Toxicol. 24**(4); 1986; 311-7

184 PHILLIPS (JC), BEX (C), MENDIS (D) and GANGOLLI (SD). Studies on the mechanism of diet-induced nephrocalcinosis: Calcium and phosphorus metabolism in the female rat. **Food Chem. Toxicol. 24**(4); 1986; 283-8

185 ANON. Modern routine microbiological control of food. **Br. Food J. 88**(930); 1986; 16-8

186 PURCHASE (IFH). Unpredictability: An essay in toxicology. **Food Chem. Toxicol. 24**(4); 1986; 343-9

Discusses: Short-term tests for carcinogens; an unpredictable paradox; trichloroethylene - a carcinogen; hexachlorobutadiene - a carcinogen; improving hazard assessment - an urgent challenge. BSN

187 STERN (NJ), GREENBERG (MD) and KINSMAN (DM). Survival of **Campylobacter jejuni** in selected gaseous environments. **J. Food Sci. 51**(3); 1986; 652-4

Potential role of vacuum packaging and modified gas atm. on survival and viability of **Camp. jejuni** in meat products during storage has been studied. Results show that the organism survives at variable rates in different atm. but these differences were relatively small and unlikely to impact on public health. MVG

188 FERREIRA (JL), HILL (WE), HAMDY (MK), ZAPATKA (FA) and McCAY (SG). Detection of enterotoxigenic **Escherichia coli** in foods by DNA colony hybridization. **J. Food Sci. 54**(3); 1986; 665-7

A DNA colony hybridization procedure was used to identify and enumerate a heat-labile toxin-producing strain of **Escherichia coli** (H 10407) in various types of foods. Foods were seeded with H10407 cells and examined by DNA hybridization on nitrocellulose filters with 32Plabeled heat-labile toxin gene fragments. The number of cells recovered on plate count agar and eosine methylene blue agar was compared. With nitrocellulose filters, recoveries were about 81% on plate count agar and about 76% on eosine methylene blue agar. No significant differences in recovery were observed with ten different food types. AA

9 MARRIOTT (NG), COLLINS (WF) and BOLING (JW). Microbial load of beverage glasses. **J. Food Qual.** 9(2); 1986; 115-9

Beverage glasses were randomly sampled during the winter (Study I) to determine cleanliness. During the spring, random sampling of beer glasses from one establishment of Study I and two additional outlets was conducted (Study II). Contamination level of soft drink and wine glasses was not different ($P > 0.05$). Microbial load of beer glasses was higher than for other glasses. Beer glasses from one establishment had more ($P < 0.05$) contamination than those from the other units. Current operational and sanitary practices conducted at those establishments studied (except Establishment D) are effective enough to provide acceptable cleanliness. AA

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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm, cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal, kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg, ml, mm)
m-equiv	milli-equivalent
$\mathcal{M}$	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano- (10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
$\mathcal{P}$	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minut
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphat
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp., spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro- (as in µg, µm)
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for a elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

GENERAL

190 HOLZAPFEL (G) and SCHOBER (G). Byproducts of the food industry - Development of the occurrence of organic byproducts in the food industry and their utilization. **Ernahrungsforschung. 31**(2); 1986; 53-4 (De)

Byproducts of the food industry are valuable secondary raw materials which are already being used to a large extent. Such materials are becoming more and more important, because of the use in the price of primary raw materials. The byproducts also constitute a valuable source of raw material for biotechnological installations in the GDR. KMD

FOOD PROCESSING AND PACKAGING

Processing

191 LEKWAUWA (AN) and HAYAKAWA (KI). Computerized model for the prediction of thermal responses of packaged solid-liquid food mixture undergoing thermal processes. **J. Food Sci. 51**(4); 1986; 1042-9, 1056

Packaging

192 BERETTA (GM). Plastic packaging and Italian laws for food products. **Ind. Aliment. 25**(1); 1986; 1-10 (It)

193 McGINNIS (DS). Surface heat transfer distribution in a weir type pressurized water retort for processing foods in flexible retort pouches. **Can. Inst. Food Sci. Technol. J. 19**(2); 1986; 45-52

A method for measuring water surface (film) heat transfer coeff. in a retort for processing foods in flexible retort pouches was developed. The retort which was studied employs horizontally flowing water between stacked trays which contain the food pouches during the thermal sterilization cycle. The method was used to measure the distribution of the surface heat transfer coeff. throughout the retort during the heating and cooling cycles. Film coeff. values obtained at various temp. were found to vary considerably according to test location, and processing phase (whether heating or cooling). The average values observed at 120° C varied between 1100 and 2400 W/(m^{2}.°C) for heating and between 1800 and 4100 W/(m^{2}:C) for cooling. These values were found to be much smaller than film coeff. values for steam-air mixtures obtained by others under laboratory test conditions. The measured surface coeff. values were used in a computer simulation to determine the transient heat transfer response of beef and potato in pouches subjected to thermal processes of various process times. This study revealed that the observed variation in the film coeff. produces large relative variations in total integrated centre point lethality. AA

194 MOHR (E) and WICHMANN (G). Is moderate irradiation of foods and packaging sensible? **Gordian. 86**(1&2);1 1986; 20 (De)

A brief discussion of the legal position relating to food irradiation in W. Germany is followed by the conclusion that co-irradiation can produce biological changes in the nature of food components; e.g. change in the immunochemical nature of the proteins of

nuts. Hence, the effects of irradiation on various protein-containin
products need to be studied in greater detail. KMD

195 ZURITZ (CA) and SASTRY (SK). Effect of packaging materials on tem
perature fluctuations in frozen foods: Mathematical model an
experimental studies. **J. Food Sci. 51**(4); 1986; 1050-56

FOOD ENGINEERING AND EQUIPMENT

Nil

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

196 BIRCH (GC) and SHAMIL (S). Structure/activity relationships in sweetness. **Food Chem. 21**(4); 1986; 245-58

The solution parameters of simple sweet mole. show fine destructions which are, in many cases, attributable to their structural differences. It seems that intensity-time-concn relationships are due to corresponding solution property-concn relationships and this approach might lead to an understanding of the kinetics of taste chemoreception. KAR

197 GERSCHENSON (LN), ALZAMORA (SM) and CHIRIFE (J). Stability of sorbic acid in model food systems of reduced water activity: Sugar solutions. **J. Food Sci. 51**(4); 1986; 1028-31

The behaviour of sorbic acid in model systems comprised of conc. sugar solutions (water activity 0.94) at pH 3.5 and 4.5 was studied. Srobic acid degraded appreciably as a function of time and temp. during storage and its destruction could be described by first-order kinetics. The rate constants of sorbic acid destruction were found to be related to composition of the sugar model system. Non-enzymatic browning reactions which occur in systems containing lysine greatly influenced the kinetics of sorbic acid destruction. AA

198 KITIC (D), JARDIM (DCP), FAVETTO (GJ), RESNIK (SL) and CHIRIFE (J). Theoretical prediction of the water activity of standard saturated salt solutions at various temperatures. J. Food Sci. 51(4); 1986; 1037-41

MOODY (GJ), SANGHERA (GS) and THOMAS (JDR). Amperometric enzyme electrode system for the flow injection analysis of glucose. **Analyst. 111**(6); 1986; 605-9

A flow injection systems incorporating an amperometric enzyme electrode is described. Glucose oxidase immobilised on nylon mesh and held over a platinum electrode formed the basis of the electrode, which was incorporated in a three-electrode amperometric Stelte cell, modified for flow injection analysis. The flow and Enzymatic reaction conditions have been optimised for max. glucose response. The system exhibited good linearity (0.01 to 3.0 mM glucose), short response time (< 45 s), good capacity (24 h with a continuous flow of 2.5 mM glucose) and long lifetimes (upto 4 months with storage at 4°C). Data for the determination of glucose in foodstuffs with the enzyme electrode were similar to those obtained by the Yellow Springs Instrument glucose analyser and a soluble enzyme test kit (Boehringer Mannheim method). AA

200 WOOLLARD (DC). Expanding use of HPLC in food analysis. **Food Technol. NZ.** 21(3); 1986; 36-9, 56

Technology of HPLC, and applications in protein, fats, carbohydrates, micronutrients, amino acids, fatty acids, organic acids, fat soluble vitamins, water soluble vitamins, and other micronutrients. KAR

FOOD LAWS AND REGULATIONS

Nil

FOOD MICROBIOLOGY

201 THAKUR (DN), SAROJ (KK), GUPTA (A) and SRIVASTAVA (SK). Microbial production of protein from methane. **Res. Ind.** 31(2); 1986; 106-10

Strains of methylotrophs were isolated, purified, enriched and preserved in methane: air mixture in the laboratory and were used to synthesise protein using methane as a sole source of carbon and energy. A double chamber Neubauer haemacytometer was used to obtain the bacterial counts in the culture broth. Results showed that the methylotrophs consumed methane and the cell counts and protein increased with the amount of methane consumed by the organisms. The max. amount of proteins formed was 14.01 mg/70.0 ml media after 10 days of incubation and the cell counts were 52.00 x 10^7 cells/ml. MVN

Mushrooms

202 BALDWIN (DR), ANATHESWARAN (RC), SASTRY (SK) and BEELMAN (RB). Effect of microwave blanching on the yield and quality of canned mushrooms. **J. Food Sci.** 51(4); 1986; 965-6

Shrinkage of mushrooms during blanching and retorting processes was studied using microwave and boiling water blanching treatments. A microwave blanching treatment of 4 min 40 sec at the high setting in a microwave oven was compared to a 7 min boiling water, conventional blanching treatment. Data showed that the microwave blanching process was superior with respect to yield, allowing for a significant ($p < 0.01$) increase in net yield (3.41%) for three trials. Colour and sensory analyses of the canned mushrooms showed that the two treatments were not significantly different ($p \leq 0.05$) with respect to flavour, texture, colour and overall acceptability. AA

FOOD ADDITIVES

Emulsifiers

203 GERHARDT (U) and SCHOPFEL (B). Application of emulsifiers in the food industry. **Boridan.** 86(1&2); 1986; 11-4 (De)

A brief review of the properties of emulsions is followed by some notes on how emulsions may be stabilized, and how a stable emulsion of a spice extract may be prepared. KMD

Gums

204 AL-HAZMI (MI) and STAUFFER (KR). Gas chromatographic determination of hydrolyzed sugars in commercial gums. J. Food Sci. **51**(4); 1986; 1091-92, 1097

205 KALETUNC-GENCER (G) and PELEG (M). Rheological characteristics of selected food gum mixtures in solution. **J. Texture Stud. 17**(1); 1986; 61-70

The viscosity of pure and mixed dilute solutions of commercial alginate, carrageenan, guar gum, CMC and gelatin solutions at different mixing ratios were measured by a coaxial viscosimeter at different shear rates. The results are presented in the form of measured viscosity divided by the expected viscosity, if no interaction between the gums existed. This technique provides a clear demonstration of the existence of synergism or antagonism between the gums and helps in quantitatively assessing their extent. AA

Fructose

206 SONI (PL) and SHARMA (HW). High fructose syrup - a potential nutritive sweetener. **Res. Ind. 31**(2); 1986; 144-7

The prospects of utilisation of starch from the forest and agriculture sources for the production of nutritive sweeteners like glucose syrup, crystalline dextrose and high fructose syrup is presented. Optimum conditions for the isomerisation of glucose to fructose using strongly basic resins has been worked out. An anion exchange resin in the presence of K_2HPO_4 (dibasic) has shown specificity of the isomerisation reaction of glucose to fructose which is comparable with the enzymic method. High fructose syrup possesses equal sweeteness and lesser calorific value in comparison to common sugar i.e. sucrose and can be used as a substitute for it in different food preparations. AA

CEREALS

207 GALLIARD (T). Hydrolytic and oxidative degradation of lipids during **storage** of **wholemeal** flour: Effects of bran and germ components. J. **Cereal** Sci. 4(2); 1986; 179-92

Use of rapid and sensitive O2-electrode method supported by lipid analysis to determine some of the factors that affect changes in whole meal during storage has been described. Further evidence has been provided for the synergism between the bran and germ components. MVG

Barley

208 AMAN (P) and NEWMAN (CW). Chemical composition of some different type of barley grown in Montana, U.S.A. J. Cereal Sci. 4(2); 1986; 133-41

209 MACGREGOR (AW), WESELAKE (RJ), HILL (RD) and MORGAN (JE). Effect of an α-amylase inhibitor from barley kernels on the formation of products during the hydrolysis of amylose and starch granules by α-amylase II from malted barley. J. **Cereal** Sci. 4(2); 1986; 125-32

High performance thin layer chromatography was used to analyze the products formed during degradation of amylose and starch granules by α-amylase II from malted barley in the presence and absence of an α-amylase inhibitor from barley kernels. A 40-fold molar excess of inhibitor reduced significantly the rate of α-amylolysis of amylose, but the composition of the dextrin mixture formed was not altered by the inhibitor. Significant inhibition of starch granule hydrolysis by α-amylase II was obtained in the presence of a 6-fold molar excess of inhibitor over enzyme. The composition of the low mol. wt. products obtained during α-amylolysis of starch granules appeared to be slightly altered by the inhibitor. It appears unlikely that the inhibitor decreases the rate of starch granule hydrolysis by preventing adosprtion of α-amylase II to the starch granules. AA

210 MacGREGOR (AW) and MORGAN (JE). Hydrolysis of barley starch granules by alpha-amylases from barley malt. **Cereal Food World. 31**(9); 1986; 688-93

Malt α-amylases solubilized small starch granules from barley faster than large granules. α-Amylase I (low pI component) was more efficient than α-amylase 2 (high pl component) in solublizing large granules. A high proportion of the soluble products formed during α-amylolysis of starch granules were small mol. wt. linear dextrins. The remaining products appeared to be highly branched. α-Amylolysis of starch granules did not increase in the presence of β-amylase and pullulanase, and the products of starch hydrolysis did not appear to inhibit α-amylase under the experimental conditions. Starch concn were not saturating so excess α-amylase was always present in the digests. AA

211 SMITH (DB), LISTER (PR) and HANSON (PR). Discrimination of barley varieties by electrophoresis of endosperm proteins extractable into a mixture of sodium dodecyl sulphate, 2-mercaptoethanol and dimethylformamide. **J. Cereal Sci. 4**(2); 1986; 107-16

Rye

212 SEIBEL (W), BRUMMER (J.-M) and MORGENSTERN (G). Quality of rye and wheat flours in the economic year 1984/85. **Getreide Mehl. Brot. 40**(4); 1986; 103-7 (De)

Triticales

213 WEIPOERT (D), ZWINGELBERG (H) and STEPHAN (H). Milling technological aspects in the processing of triticale. **Getreide Mehl. Brot. 40**(4); 1986; 107-16 (De)

The main difficulties in the manufacture of milled products from triticale lie in the physical properties of the grain, especially with regard to cleaning of the grain. Moreover, a great quantitative as well as qualitative variation in the components of the grain, and there is also a great risk of sprouting. All these factors have disadvantageous effects on the milling and baking behaviour of triticale. KMD

Wheat

214 BAINS (GS). Wheat quality requirements for domestic consumption and export needs. **Indian Miller. 17**(3); 1986; 5-7,9,11,13,15

Quality of wheat required for atta (whole wheat flour) and chapaties; milling and baking use; the potential of Indian wheats for milling and baking; quality specification for internal procurement and for export; and the need for developing institutional market research infrastructure have been covered. MVG

215 BARNES (PJ). The influence of wheat endosperm on flour colour grade. **J. Cereal Sci. 4**(2); 1986; 143-55

216 DEXTER (JE) and MARTIN (DG). The effect of prebreak conditions on the milling performance of some Canadian wheats. **J. Cereal Sci. 4**(2);

1986; 157-69

The effect of prebreak roll surface (smooth or corrugated), prebreak release, and prebreak roll differential on the milling performance of some Canadian wheats of varying hardness was investigated. The major benefit of a prebreak was a significant reduction in flour ash content. Generally, smooth prebreak rolls imparted a greater effect than corrugated rolls. Flour colour was improved marginally by a prebreak. Total milling energy requirements without a prebreak, and under the various prebreak conditions, exhibited a narrow range for all wheats studied. As a result a prebreak had little effect on flour starch damage and starch damage-related quality factors. AA

217 KIM (K-O), HANSEN (L) and SETSER (C). Phase transitions of wheat starch-water systems containing polydextrose. **J. Food Sci.** 51(4); 1986; 1095-7

Equivalent concn of polydextrose and sucrose had similar effects on phase transitions of wheat starch-water systems. Onset and peak gelatinization temp. were increased similarly with the two solutes. This was true with varied water:starch ratios, varied concn of solute, and for batters prepared with the two solutes. Acesulfame K, cyclamate, and saccharin at low levels, as might be used in food products, had little effect on phase transitions of starch-water-solute systems. AA

218 MOSS (R) and MUGFORD (DC). Analysis and microscopic examination of faecal residues and insoluble dietary fibre from wheat bran and other wheat products. **J. Cereal Sci.** 4(2); 1986; 171-7

Microscopic examination of the wheat bran fragments present in sections of human faeces showed that the granular aleurone contents were still present. Phytin inclusions were absent and the aleurone cell walls were partly digested. This weakened the adhesion between the aleurone and the overlying bran layers, thus allowing them to become easily separated when the faecal material was washed prior to examination. The American Association of Cereal Chemists' (AACC) Insoluble Dietary Fibre (IDF) procedure removed the contents of the aleurone cells but left the cell walls in place, giving the lowest fibre results of the methods studied. The aleurone contents and variable amounts of endosperm material were present in the fibre residues from α -amylase digestion and from neutral ditergent digestion. The fibre residue from the IDF method, with the two digestion steps reversed, had a microstructural appearance that most closely resembled that seen in human intact faecal material. AA

219 OMAYE (ST) and CHOW (FI). Lipid-soluble vitamins in blood and liver of rats fed a diet containing hard red spring wheat bran. **J. Food Sci.** 51(4); 1986; 1001-4

Male Sprague-Dawley rats were fed ad libium for 9 wk with semipurified diets containing either 0 or 20% wheat bran. Wheat bran did not affect vitamin A or E levels in plasma, leukocytes or liver, nor vitamin E levels in erythrocytes after 9 wk. However, values showed transient declines during the study period. In leukocytes and livers of bran-fed rats both vitamins showed similar declines. Wheat bran also affected erythrocytes vitamin E levels but no vitamin A could be detected. It was concluded, therefore, that rats adopt to diets containing high levels of wheat brans possibly by metabolic or gastrointestinal modifications. MVG

220 SCHIPPER (A), JAHN-DEESBACH (W) and WEIPERT (D). Wheat quality and climatic conditions. **Getreide Mehl Brot.** 40(4); 1986; 99-103 (De)

A two-year study conducted in controlled-climate chambers showed that climatic factors - especially temp. - have a distinct effect on the protein level of the wheat grain (summer var."Schirokko") during the grain filling phase, and on the quality of the wheat grain. Results of studies on winter wheats will be reported later. KMD

221 SCHWEIZER (TF) and REIMANN (S). Influence of drum-drying and twin-screw extrusion cooking on wheat carbohydrates. I.A. Comparison between wheat starch and flours of different extraction. **J. Cereal Sci. 4(2); 1986; 193-203**

Wheat starch and two wheat flours of different extraction rates were processed under identical conditions by drum-drying and twin-screw extrusion cooking. Extrusion cooking of flours decreased the amounts of 80% ethanol-soluble carbohydrates. Both processes increased the amounts of 40% ethanol-soluble materials very slightly and did not produce malto-oligosaccharides smaller than about 15 glucose units. Neither process affected dietary fibre and starch contents, but the amount of starch measured depended on sample preparation Extrusion cooking increased the water solubility more than did drum-drying, but in both cases solubility decreased in the order starch > 80% extraction wheat flour > 98% extraction flour. Extrusion cooking led to slight starch degradation, as shown by gel-filtration chromatography. The extents of starch breakdown in flours and pure starch were the same, showing that the proteinaceous and fibrous matrix did not protect starch from degradation. Starch digestion rates assessed **in vitro** with four different amylases, were similar in all samples. Thus, water solubility, breakdown and **in vitro** digestion rate of starch were not related. AA

222 SHEWRY (PR), TATHAM (AS), FORDE (J), KREIS (M) and MIFLIN (BJ). The classification and nomenclature of wheat gluten proteins: A reassessment. **J. Cereal Sci. 4(2); 1986; 97-106**

The nomenclature, relationships and classification of wheat gluten proteins are discussed in relation to recently-reported amino acid sequences of individual components. Although all gliadin and glutenin components show some degree of sequence relationship, three groups of closely related proteins can be recognised. These are high mol. wt (HMW) prolamins (HMW subunits of glutenin), the S-poor prolamins (ω-gliadins) and the S-rich prolamins. The latter group includes gliadins (α -, β -, γ -) and glutenins (LMW subunits). It is concluded that the classical division into gliadins and glutenins is based on a secondary characteristic, the formation of inter- or intra- mol. disulphide bonds, rather than on homology of the primary amino acid sequences. AA

MILLETS

Maize

223 BHATTACHARYA (M), HANNA (MA) and KAUFMAN (RE). Textural properties of extruded plant protein blends. **J. Food Sci. 51(4); 1986; 988-93**

Blends of corn gluten meal and soy protein conc. in the ratio of 25:75, 50:50 and 75:25 w/w were made up. The blends at 20, 30 and 40% moisture content (db) were extruded at 145 C through 4.24, 3.0, 2.12 mm diam dies at screw speeds of 60, 120, and 180 rpm to generate different shear environments. Multiple nonlinear regression analysis was used to develop models of bulk density, puff ratio, water-holding capacity and shear strength as a function of moisture content and shear rate. Shear rate affected the dependent variables most. Cooked and uncooked viscosity and product colour were also measured. Electron micrographs confirmed some of the findings. AA

224 BRENNER (PE), RICHMOND (P) and SMITH (AC). Aqueous dispersion rheology of extrusion cooked maize. **J. Texture Stud.** 17(1); 1986; 51-60

The effects of twin screw extrusion cooking of maize grits at different high moisture contents are described. Starch granules survive in the extrudate at high extrusion moisture or with a low shear screw configuration. The aqueous dispersion rheology of the milled extrudate and its dependence on shear rate and heat treatment is explained in terms of the starch swelling behaviour and solubility. These data resemble that of raw maize most closely for the low shear screw configuration. For the high shear configuration under similar conditions of moisture, temp. and mechanical energy dissipation, starch granules are not seen and the dispersion rheology is markedly different from that of raw maize. AA

225 CHINACHOTI (P) and STEINBERG (MP). Crystallinity of waxy maize starch as influenced by ambient temperature absorption and desorption, sucrose content and water activity. **J. Food Sci.** 51(4); 1986; 997-1000, 1036

Crystallinity of waxy maize starch was determined by X-ray diffraction. Absorption and desorption over the range 0.33 - 0.84 water activity (a_w) were applied to raw, partially gelatinized, and completely gelatinized starches mixed with 0-50% sucrose. Increasing aw and moisture content increased crystallinity in case of all three starch treatments. A critical moisture content was required for recrystallization of starch. Gelatinized starch showed the greatest crystallinity hysteresis which was much greater than water sorption hysteresis. Sucrose had no effect on starch crystallinity with absorption. With desorption of completely gelatinized starch-sucrose mixtures, the sucrose caused a sharp decrease in crystallinity at 0-10% sucrose while, at higher sucrose content, the crystallinity increased. AA

226 GOMEZ (MH) and AGUILERA (JM). Sweetened extruded corn/soy product as intermediate moisture food. **J. Food Sci.** 51(4); 1986; 979-81

An intermediate moisture food analog of sweetened condensed milk was developed based on soy protein, modified degermed corn, vegetable oil and sugar. Water solubility of corn was increased by extrusion-cooking followed by saccharification with glucoamylase in a 28% total solids (TS) soy protein-extruded corn suspension. Enzyme-modified corn/soy conc. with 40-45% TS had a water solubility index (WSI) of 56-58% and a DE of 38-40. The final products had 73.5-78.4% TS, 71.5-72.7 WSI at pH 4.1-4.2, and a a_w of 0.82-0.83. AA

227 MEUSER (F), REIMERS (H) and TSEKE (A). Processing of Senegalese white maize to rice imitates and by-products for composite flours and feedstuffs. **Getreide Mehl Brot.** 40(4); 1986; 118-22 (De)

A simple process for converting Senegalese white maize/ (var. "Blanche de Sefa") to a rice-like product (maize-rice), cous-cous (semolina), and flour has been described. The yield of maize-rice from maize was 50%, and the total yield of all the products 80%. Maize-rice showed a good cooking quality (i.e. firmness on cooking) and resembled broken rice in its nutritional and sensory properties. The flour obtained in the process could be made into maize sticks. About a fifth of the total grain weight was suitable for making an animal feed of good quality. A pilot plant for the milling of 500 kg maize/h has been designed; it is hoped that imports of rice and wheat may be reduced by a greater and more versatile utilization of maize. KMD

Pearl millet

228 SUBRAMANIAN (V), JAMBUNATHAN (R) and RAMAIAH (CD). Physical and chemical characteristics of pearl millet grains and their relationship to roti quality. **J. Food Sci.** 51(4); 1986; 1005-8, 1020

Twenty cv. of pearl millet comprising local types, popular hybrids or prerelease lines, were examined for physical characteristics like swelling capacity of grain and flour and water-soluble flour fraction, and chemical characteristics such as protein, starch, amylose, soluble sugars and fat content. **Rotis** made from these cv. were evaluated for colour, texture, odour, taste and acceptability by a trained taste panel. The correlations between physicochemical characters and **roti** quality were worked out. **Roti** quality was influenced by swelling capacity, water soluble fraction, water soluble protein and amylose content of the flour. MVG

Sweet corn

229 DRAKE (SR) and SWANSON (BG). Energy utilization during blanching (water vs steam) of sweet corn and subsequent frozen quality. **J. Food Sci. 51**(4); 1986; 1081-2

Energy efficiency, loss of solids and frozen sweet corn quality of the cabin plant counter-flow water blancher and Gemco steam tunnel blancher, were compared. Cabin plant counter-flow water blancher resulted in substantial savings in steam energy. Frozen cut corn from both blanchers were comparable with each other in quality. MVG

PULSES

Black beans

230 SIEVWRIGHT (CA) and SHIPE (WF). Effect of storage conditions and chemical treatments on firmness, **in vitro** protein digestibility, condensed tannins, phytic acid and divalent cations of cooked black beans (**Phaseolus vulgaris**). **J. Food Sci.** 51(4); 1986; 982-7

Marked increases in firmness and decrease in **in vitro** digestibility of proteins were evident in black beans stored at 30 or 40°C and 80% RH. These changes were small when beans were stored at 5°C and 50% RH. Soaking beans in salt solutions instead of water practically eliminated adverse effects of poor storage conditions. Changes in detectable tannins and phytates occurred with changes in firmness and digestibility. Interactions between protein and tannins, particularly of high mol. wt. tannins, appeared to reduce protein digestibility. Polyphenol oxidase activity reduced the concn. of these tannins. With decrease in phytic acid firmness increased and protein digestibility decreased. MVG

Black grams

231 CHITRA (R) and SADASIVAM (S). A study of the trypsin inhibitor of black gram (**Vigna mungo** (L.) Hepper). **Food Chem.** 21(4); 1986; 315-320

Trypsin inhibitor activity (TIA), water-soluble protein and total protein contents varied markedly among the twenty cv. of black gram grains assayed. Although no relationship could be established between TIA and total protein content, significant positive correlation was seen between TIA and water-soluble protein. During the ontogeny of seed, the TIA and water-soluble protein increased gradually. However, during germination, TIA was found to decrease up to 48 h and this was followed by a sharp increase. AA

Cowpeas

232 DICK (KM) and CREDLAND (PF). Variation in the response of **Callosobruchus maculatus** (Fo) to a resistant variety of cowpea. **J. Stored Prod.** 22(1); 1986; 43-8

The survival and duration of development of the immature stages of three strains of C. **maculatus** in the dried seeds of this cv., were compared with the performance of the same strains of beetle on a susceptible var. In all beetle strains fewer larvae survived to produce adults, and the duration of development was significantly longer than the mean development period. Evidence is presented indicating that factors in both the cowpea seeds and the beetles themselves may contribute to the poorer performance of bruchids. KAR

Dry beans

233 GERSCHENSON (LN) and BARTHOLOMAI (GB). Effect of thermal treatment on the rheological pattern and composition of dry bean flour soluble extracts. J. **Food** Sci. **51**(4); 1986; 1085-6

Dry bean flour samples with 14% (dry basis) moisture content were exposed to thermal treatment, in sealed cans, at 50, 70, 80 and 90°C, for various periods. The rheological pattern and composition of their soluble extracts, obtained at pH 10, were determined. Soluble extracts decreased in viscosity with time of treatment, up to a time dependent on temp, where viscosity became constant. Soluble protein decreased with time of treatment. During the first step of dry bean flour heat treatment, soluble solids other than protein, were constant, then began to increase, promoting viscosity constance in spite of soluble protein decrease. AA

Horse grams

234 VIJAYA KHADER and VENKAT RAO (S). Limiting amino acids in horse gram (**Dolichos biflorus**). **Indian J. Nutr. Diet. 23**(6); 1986; 158-64

Limiting amino acids (LAA) in horse gram were determined from measurement of plasma amino acid (PAA) scores and ratios after feeding cooked whole horse gram and the effect of amino acid supplementation on the protein efficiency ratio (PER) of whole and dehusked gram. Results showed that methionine was the major LAA in horse gram protein as judged by PAA scores and ratio and growth response of weanling rats. Threonine and tryptophan were the other minor limiting amino acids. The PER of whole and dehusked horse gram improved from 1.3 to 2.3 and 1.4 to 2.8 resp. on supplementation with methionine. Dehusking reduced the cooking time significantly from 90 to 30 min. MVG

Moth beans

235 KHOKHAR (S) and CHAUHAN (BM). Effect of domestic processing and cooking on **in vitro** protein digestibility of moth bean. J. **Food Sci. 51**(4); 1986; 1083-4

Protein digestibility (**in vitro**) of dry seeds of moth bean cv., varied significantly from 58.69 to 62.06%. The protein digestibility improved significantly when the seeds were given different domestic processing and cooking treatments including soaking, sprouting, ordinary cooking and pressure cooking. Pressure cooking of the seeds presoaked in plain water or mixed mineral salt solution had the most pronounced effect. AA

OILSEEDS AND NUTS

Rapeseeds

236 FISCHER (PWF), L'ABBE (MR), GIROUX (A) and JONES (JD). Effect of zinc supplementation on copper status of rats fed rapeseed protein concentrate. **Can. Inst. Food** Sci. **Technol**. J. 19(2); 1986; 82-5

The effects of adding increasing amounts of Zn (100, 150, 200, 250 and 300 mg/kg) to a basal diet containing 20% protein from Tower (**Brassica napus**) rapeseed protein conc. (RPC) to the Cu status of young rats was investigated. Differences in the activities of serum ferroxidase (ceruloplasmin), heart and liver superoxide dismutase and cytochrome c oxidase, as well as serum, liver and heart Cu concn. were used to assess changes in Cu status. Changes in tissue Zn levels were also determined. Heart cytochrome c oxidase activity and Cu concn. were slightly, but significantly reduced in the two highest Zn diets when compared to the lowest diet. Serum and liver Zn increased significantly in the highest Zn group, compared to the lowest. No other significant changes among the groups were observed. These data suggest that when Zn up to at least 250 mg/kg, is added to diets containing RPC in order to overcome the detrimental effects of the large amount of phytic acid associated with this protein source, it does not affect Cu status. AA

237 NACZK (M), SHAHIDI (F), DIOSADY (LL) and RUBIN (LJ). Removal of glucosinolates from Midas rapeseed and mustard seed by methanol-ammonia. **Can. Inst. Food Sci. Technol. J. 19**(2); 1986; 75-7

A two-phase solvent extraction system for the removal of glucosinolates from Midas (high-glucosinolate) rapeseed and mustard seed was studied. The polar phase consisted of different levels of ammonia in methanol containing 5% water, and hexane was used as the non-polar second phase. The effect of a quiescent contact period, the concn of ammonia, and the ratio of the vol. of the methanol/ammonia phase to the **wt** of seed (R) on the glucosinolate content of the meal was studied. The optimum conditions for glucosinolate removal at room temp. were a 30-min quiescent period, 10% ammonia concn., and R=6.7. Over 98% of all glucosinolate was removed after a second extraction of the resultant meal with the above extraction system under optimum conditions. AA

238 RUBIN (LJ), DIOSADY (LL), NACZK (M) and HALFANI (M). The alkanol-ammonia-water/hexane treatment of canola. **Can. Inst. Food Sci. Technol. J. 19**(2); 1986; 57-61

A new two-phase solvent extraction system was developed for the treatment of rapeseed (canola). The polar phase consisted of a lower alkanol containing 0-14% (w/w) of ammonia and 0-15% (v/v) of water. The non-polar phase was hexane. Of the alkanols, methanol was the most effective, followed by ethanol. Isopropanol and t-butanol were of limited usefulness. Methanol containing 5% water (v/v) and 10% ammonia (w/w) gave the best overall results at a solvent-to-seed (R) ratio of 6.7 (v/w) and a blending time of 2 min. followed by a quiescent period of 15 min. At this point hexane was added (R = 6.7) and the mixture stirred vigorously. The phases were separated by usual means. The hexane phase contained 79-89% of the oil present in the original seed. More oil could be extracted from the meal and the methanol phase. The oil-free meal was light in colour and bland in flavour. Its glucosinolate content was below the detection level of the analytical method employed. AA

Soybeans

239 ESCUETA (EE), BOURNE (MC) and HOOD (LF). Effect of boiling treatment of soymilk on the composition, yield, texture and sensory properties of tofu. **Can. Inst. Food Sci. Technol. J. 19**(2); 1986; 53-6

Soymilk was boiled for 0, 12, 30 and 60 min before coagulation with $CaSO_4$ to make **tofu**, and a texture profile analysis was performed on the product obtained. Hardness and gumminess increased slightly up to 12 min of boiling but decreased significantly after 30 and 60 min of boiling the soymilk. Chewiness decreased significantly after 30 and

60 min of boiling. Springiness was not affected by boiling. Cohesiveness increased slightly after 12 min boiling and then decreased slightly but not significantly after 30 and 60 min of boiling. Composition and sensory qualities of tofu were not significantly affected by the length of time soymilk was boiled prior to coagulation. AA

240 MORR (CV) and SEO (A). Comparison of methods to remove endogenous iron from soy protein isolates. **J. Food Sci. 51(4)**; 1986; 994-6

The relative effectiveness of ion exchange, dialysis, heating and partial enzyme digestion treatments and the use of EDTA, oxalate, and ascorbic acid was evaluated for removing endogenous Fe from soy protein isolate. The pH 2 ascorbic acid dialysis treatment removed about 60% of the endogenous Fe from soy isolate, but the neutral to mildly alkaline treatments generally failed to remove > 30% of the endogenous Fe. The results of this study were interpreted to indicate that factors other than the proposed phytate-Fe-protein complex were responsible in large measure for the incomplete removal of endogenous Fe from soy protein isolate. AA

TUBERS AND VEGETABLES

241 BRADBURY (JH) and SINGH (U). Ascorbic acid and dehydroascorbic acid content of tropical root crops from the South Pacific. **J. Food Sci. 51(4)**; 1986; 975-8, 987

The total vitamin C content (ascorbic acid (AA) plus dehydroascorbic acid (DAA) was estimated by HPLC for sweet potato (**Ipomoea batatas**), taro (**Colocasia esculenta**), giant taro (**Alocasia macrorrhiza**), giant swamp taro (**Cyrtosperma chamissonis**), taro (**Xanthosoma spp.**), yam (**Dioscorea alata**), yam (**D. esculenta**), cassava (**Manihot esculenta**) and mean values were 23.6, 15.1, 16.9, 15.7, 13.6, 27.5, 20.3 and 14.9 mg/100g fresh wt, resp. Standard titrimetric and colorimetric methods gave results only for AA which were generally comparable with HPLC. Drying at 40°C caused loss of AA which was not quantitatively converted into DAA. Storage of sweet potato at 25°C and 15°C for 28 days reduced the total vitamin C content by 17% and 15%, resp.; there was no significant decrease at 0°C. Cooking reduced the levels of AA and DAA by up to 70%. AA

Sweet potatoes

242 CHIANG (BH) and PAN (WD). Ultrafiltration and reverse osmosis of the waste water from sweet potato starch process. **J. Food Sci. 51(4)**; 1986; 971-4

The primary waste water discharged from pilot plant scale sweet potato starch manufacturing was processed by ultrafiltration (UF). The UF permeate was then conc. by reverse osmosis (RO). Growth of microorganisms in waste water would reduce the flux of UF. When the feed velocity of UF was higher than 2.5 m/sec, its positive effect on permeation rate was no longer existent. Relationships between transmembrane pressure and permeate flux were linear at all tested concn. UF filtered protein and cu reduced two-thirds of the biochemical oxygen demand (BOD) and half the chemical oxygen demand (COD) at wt concn ratio (WCR) of 5. With RO the rest of the components were recovered and BOD and COD were reduced more than 99 and 98%, resp., at a WCR of 6. AA

243 WALTER (WM) Jr. and HOOVER (MW). Preparation, evaluation and analysis of a French-fry-type product from sweet potatoes. **J. Food Sci. 51(4)**; 1986; 967-70

A French-fry-type product was prepared from 'Jewel' and 'Centenial' sweet potatoes. Samples were prepared from freshly harvested, cured, and stored, cured roots. The roots were peeled, sliced into strips and blanched in hot water. The blanched strips were partially dehydrated by 1 to 5 treatments and then frozen at -30°C. Frozen strips were fried in hot peanut oil and evaluated by a sensory panel. Strips prepared by dehydration in a hot air tunnel at 120°C for 5 min were favoured by the sensory panel. Blanching removed significant amounts of DM and resulted in partial hydrolysis of the starch by endogenous enzymes. Sensory colour scores were not affected by reducing sugar content. Sensory flavour scores were related to total sugar content. AA

Tomatoes

244 LOPEZ (A), WILLIAMS (HL) and COOLER (FW). Essential elements in tomatoes and fresh and canned tomato juice. **J. Food Sci. 51**(4); 1986; 1071-2

Sixteen essential elements along with Cd and Pb were determined in tomatoes (**Lycopersicon esculentum** L.) and fresh and canned tomato juice by atomic absorption spectrophotometry. Samples were taken during the canning process to determine where changes in element content occurred. The concn. of each sample was compared statistically to other samples taken at different stages of the process. RDAs and estimated safe and adequate daily dietary intake values as well as per cent retention values were calculated. Retention of all elements, except chloride and Na, ranged from 91-160%. AA

FRUITS

Apples

245 CHU (CL). Poststorage application of TAL prolong on apples from controlled atmosphere storage. **Hortscience. 21**(2); 1986; 267-8

A poststorage application of TAL Pro-long reduced the softening of low-oxygen- (LO) stored 'McIntosh' and controlled-atmosphere (CA) stored 'Delicious' apples (**Malus domestica** Borkh) during a 21-day shelf-life period at 15° C and 90 to 95% RH. The treatment did not affect fruit firmness of CA-stored 'McIntosh' or 'Empire' apples but did retard the loss of ground colour in 'McIntosh'. No physiological disorder was found in any treated fruit. AA

246 DHANARAJ (S), KRISHNAPRAKASH (MS), ARVINDAPRASAD (B), ANANTHAKRISHNA (SM), KRISHNAPRASAD (CA) and NARASIMHAM (P). Effect of orchard elevation on maturity and quality of apples. **J. Food Quality. 9**(3); 1986; 129-42

Orchard elevation showed significant influence on the number of days required for optimum harvest maturity as fruits attained the same only after 125 days at low elevation (1675 meters), and 140 days at high elevation (2590 meters). High elevation fruits showed significantly better colour and appearance, texture and juiciness but poorer aroma and taste compared to low elevation fruits. Harvesting fruits between 125-145 days after full bloom at low elevation and 140-170 days at high elevation is recommended for better keeping quality during storage. KAR

247 SCOTT (KJ), WILLS (RBH) and YUEN (CMC). Reduction of bitter pit of apples with phorone. **Hortscience. 21**(2); 1986; 268-9

Phorone (2,6-dimethyl-2-5-heptadien-4-one) was placed in small containers having apples put in sealed or unsealed polyethylene bags. Phorone was as effective as the post harvest dip in 4% $CaCl_2$. KAR

Apricots

248 FORD (EW) and STEFFE (JF). Quantifying thixotropy in starch-thickened, strained apricots using mixer viscometry techniques. **J. Texture Stud. 17(1)**; 1986; 71-85

Starch-thickened, strained apricots were found to exhibit irreversible thixotropy. Shear stress and shear rate were estimated from mixer viscometer data. A structural parameter, yield stress, flow behaviour index and a consistency coeff. were determined to quantify the rate of breakdown and equilibrium structure of the product. The techniques developed in this study are useful in describing the time-dependent behaviour of suspensions because the slip at the wall is minimized. AA

Avocados

249 RENSBURG (EV) and ENGELBRECHT (AHP). Effect of calcium salts on susceptibility to browning of avocado fruit. **J. Food Sci. 51(4)**; 1986; 1067-8, 1070

Bananas

250 MAILLARD (J-C). The international banana market geographical study of a 'marketing system'. **Fruits. 41(4)**; 1986; 217-38

In this nineteenth instalment, the author assesses the recent efforts aimed at organizing both the European and the international markets. This work will be concluded in the next issue of the journal. AA

Cranberries

251 MARWAN (AG) and NAGEL (CW). Microbial inhibitors of cranberries. **J. Food Sci. 51(4)**; 1986; 1009-13

Non-benzoic microbial inhibitors of cranberries were characterised using **Saccharomyces bayanus** and **Pseudomonas fluorescens**, and their inhibitory characteristics were assessed. The factors responsible for their antimicrobial properties were: (i) low pH (2.6) which inhibited many microorganisms **per se** and had an effect on the dissociation of benzoic acid which made inhibition more drastic, (ii) after raising pH to 5.2, cranberry juice still did not support the growth of S. **bayanus** and when 0.3% yeast nitrogen base was added, growth did occur at pH 5.2, (iii) proanthocyanidins and flavonols were the major microbial inhibitors other than benzoic acid. Results showed that 21.3% of inhibition was by proanthocyanidins, 18.5% by flavonols and 15.6% by benzoic acid. MVG

252 MARWAN (AG) and NAGEL (CW). Characterization of cranberry benzoates and their antimicrobial properties. **J. Food Sci. 51(4)**; 1986; 1069-70

Vacciniin (6-benzoyl-D-glucose) and benzoic acid were the only benzoates detected in extracts of the Stevens cv. of cranberry. Vacciniin represents 75% of the total and was not inhibitory to the yeasts, Gram positive, or Gram negative bacteria tested. AA

Mangoes

253 PARIKH (HR), VASEEM (A), PALEJWALA and VINOD MODI (V). Effect of abscisic acid on ripening of mangoes (**Mangifera indica**). **Indian J. Exp. Biol. 24(11)**; 1986; 722-5

Post harvest treatment of mangoes with abscisic acid (10^{-6} M) hastened the process of ripening. The respiratory (climacteric) peak as measured by CO_2 evolution was enhanced in treated fruits as compared to their untreated counterparts. The activities of various enzymes involved in sugar metabolism, viz. source synthetase, sucrose phosphate synthetase, malic dehydrogenase and malic enzyme were found to be higher in treated fruits. The decrease in firmness of the fruit, as indicated by pectin lyase levels, was more rapid in treated fruits. AA

254 VUILLAUME (C). Second International Mango Symposium, Bangalore, 20-24 May 1985. **Fruits. 41**(4): 1986; 269-74

Peaches

255 RYMAL (KS), DOZIER (WA) Jr., SATJAWATCHARAPHONG (C), KNOWLES (JW) and SMITH (DA). Effects of growth regulators on quality of ripe peach fruit: Discolouration of canned peaches. J. Food Sci. 51(4); 1986; 1065-6

Canned peaches from trees sprayed with either daminozide, ethepon or gibberellin GA_{4+7}. Firm fruits were placed in 4°C storage and green fruits were held at 23-27°C until ripe (2-3 days). Ripeness was therefore removed as a factor of chemical composition. With different treatments, no differences in skin colour were found by instrumental measurements confirming uniformity of ripeness. No significant differences were found among fresh fruit treatments in soluble solids, ascorbic acid, flesh colour or browning rate. However, canned fruit from ethepon treatment lot was markedly discoloured. MVG

Persimon

256 PESIS (E), LEVI (A) and BEN-ARIE (R). Deastringency of persimmon fruits by creating a modified atmosphere in polyethylene bags. **J. Food Sci. 51**(4); 1986; 1014-6, 1041

Removal of astringency from persimmons (**Diospyros kaki** L.) was achieved by enclosing the fruits in air-evacuated polyethylene bags. Reducing the initial in-package air volume created anaerobic conditions by decreasing the O_2 level. Induced anaerobic respiration increased the levels of CO_2, acetaldehyde and ethanol, in the atmosphere surrounding the fruit and thereby triggered the deastringency process. Deastringency in air-evacuated polyethylene bags was attained within 3-4 days at 20°C. Following the deastringency, the fruits in the bags maintained a high quality and firmness during cold storage and shelf life. Good flavour was maintained for about 10 days at 20°C, but thereafter off-flavour developed due to accumulation of volatiles. AA

Fruit products

257 DEVER (MC), BEVERIDGE (HJT), CUMMING (DB) and MacGREGOR (DR). Measurement and stability of aspartame in a fruit spread. **Can. Inst. Food Sci. Technol. J. 19**(2); 1986; 86-8

A procedure was developed for extraction and quantitation of aspartame from a fruit spread. Quantitation was by HPLC using a reverse phase column with ion pairing and detection at 260 nm. Coeff. of variation for paired extractions at different aspartame levels ranged from 2.7 to 7.1. The standard curve prepared in fruit media had R^2 values of 0.98 or 0.99 ($p \geqslant 0.01$). The method was applied in a 6-month storage trial of an aspartame sweetened apricot spread (pH 3.2). Aspartame storage losses were modeled as a first order reaction with an average half life of 168 days. AA

SUGAR, STARCH AND CONFECTIONERY

Sugars

258 ANAND (M). Upgrading khandsari industry: Ansari steam-based process saves bagasse, improves recovery. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. of India, Oct. 1986. M104-M116**

The technology adopted in the khandsari industry is very crude at present. Some proposals have been made in this paper, to improve productivity by adoption of proven techniques. A combination of heating and concn. using steam and open-fire pans, has been recommended. KMD

259 BHANDARI (RK) and SINGH (PP). Post-harvest deterioration studies in sugarcane under North Indian conditions. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. of India, Oct. 1986, Ag40-Ag50.**

Sugarcane harvested in March had high Brix (19.7%), sucrose (17.6%), purity coeff. (88.3%) and available sugar (12.2%), and lower reducing sugars (0.53%). October harvested cane gave poor quality juice. Juice quality declined with increase in time of stacking. The decline in sucrose content and available sugar was slow during the first three days and thereafter it was rapid. The Brix value increased during the first 48 h and declined rapidly thereafter. Polyethylene covers did not protect the stacked cane from deterioration. The deadline for crushing of cane in a factory is 48 h after harvest. Further delay in crushing gave poor recovery. KMD

260 BHARGAVA (OP). Improving recovery through better cane. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. of India, Oct. 1986 M158-M175**

The factors that influence sugar recovery from sugar cane have been listed as: duration of season; cane var., seed selection, treatment, and multiplication; tillage, manuring, irrigation, and interculture; planting; earthing up and tying; pests and diseases; ratooning; and harvest. There are three appendices, in the form of tables, in which the major pests (internal and external) and major diseases of sugarcane, along with measures for their control, are listed. KMD

261 BHATIA (HPS). Adoption of 0.04 mm size Nickle screen in place of 0.06 mm size in C-foreworker continuous centrifugals. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India,** Oct. 1986, M71-M84.

To minimize the sugar losses in bagasse, press mud, and final molasses, the author has used a 0.04 mm size nickle screen instead of a 0.06 mm size screen in the C-foreworker continuous centrifugal. The screen must be used in both the C-foreworker machines which will further control the molasses purity. The purity will be further reduced if the continuous crystallizers are set right and massecuites is properly conditioned before it is fed to centrifugals. The problems experienced and the remedies adopted have been delineated. KMD

262 CIRILLI (G), ALDANA CIRILLI (CS), PULGA (C) and ZAGHINI (L). H.P.L.C./R.I.D. for the assay of glucidic fraction. **Ind. Aliment.** 25(1); 1986; 35-7 (Italian)

The employ of I.R. detector is very useful for the assay of sugars in many raw materials and food and feed. The authors propose a rapid and high recovery method for the assay of glucidic fraction. AA

263 DUBEY (V) and PRASAD (M). A new method for estimation of polyphenols in cane juice. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986; C15-C19.

Magnesium chloride with gallic acid forms a coloured complex which has an absorption max. at 610 nm. This reaction was employed to determine the concn. of polyphenols in cane juice. The results have been compared with those obtained by the method of Smith and Gregory for detn. of phenol. The Mg^{++} complex process obyes Beer's law up to a gallic acid concn. of 70 p.p.m. while the Smith and Gregory procedure obeys Beer's law up to a gallic acid concn. of 30 p.p.m. KMD

264 PATEL (CL) and PATEL (DR). A case study - evaporator cleaning. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986, M90-M95.

By adjusting and standardizing the doses of chemicals the time required for evaporator cleaning was reduced to 16 h and for general cleaning 22 h. A perfect cleaning was achieved at a lesser cost, and with perfect scaling. Other benefits that accured were a shorter shut-down period, increased evaporator efficiency, and increased rate of crushing. KMD

265 PATIL (LG). A formula for calculating mixed juice percent. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986, C6-C14

A formula has been derived which expresses mixed juice % in terms of added water (A.W.) % cane, Brix and moisture % bagasse, Brix % absolute juice, and Brix % mixed juice. When applied to industrial data, it gives more reliable results. KMD

266 PERUMAL (KP). Identification and quantification of factors for the lower sugar recovery during early season. **Proc. 49th. Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986, Ag63-Ag71.

Sugarcane harvested after 12 months, had low sheath moisture, stem moisture, stem N, and stem K, but sugar recovery was higher than in cane harvested before 12 months. Sheath moisture may prove a reliable parameter for evaluation of sugar accumulation on a commercial scale. KMD

267 RAJ (D). Dependence of sugar recovery on PJ and imbibition. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986, M128-M141

A multiple regression analysis was performed to establish the relationship between Pol (PJ) and imbibition on the one hand and recovery on the other. The prediction equation derived was found to be applicable to a wide range of Pol and imbibition, over several crushing seasons and individual months. The prediction equation can also be used to employ several combinations of Pol and imbibition, in order to attain a given targeted figure for recovery. KMD

268 SHARMA (DP) and SAHU (SN). Short-tube vapour line juice heater. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986; E28-E33

A modified vapour line juice heater was fabricated and tested to effect steam economy. The rise in temp. achieved was 43-45°F, which entails a steam saving of 4.3 - 4.5% on cane. The length of the tube is 6 ft, heating surface 470 sq.ft. It is adequate for handling 50 t of cane/h. KMD

269 SHARMA (SC) and JOHARY (PC). Further studies on recirculation of second carbonation mud in first carbonated unfiltered juice. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986, M15-M43

Some studies were carried out on recirculation of second carbonation mud in first carbonated unfiltered juice, under different process parameters. The results obtained in cold weather were not unfavourable, but they were clearly adverse in hot weather. The consequences of recirculation were found to be related to the dextran level in the mixed juice, or mud, or both. Since the process of recirculation of second carbonation mud in unfiltered first carbonated juice has furnished varying results under cold and hot weather conditions, it may not be a desirable process and hence recommendation was made to wash the second carbonation mud so as to recovery the sucrose and recirculate the washings either in mixed juice or first carbonated unfiltered juice and discard the mud. KMD

270 SHUKLA (GL) and PRABHU (KA). Production of high fructose syrup as sweetening agent from corn starch and bagasse. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. of India**, Oct. 1986; G41-G48

Lactobacillus sp. producing glucose isomerase was cultivated in a modified medium in which the xylose and glucose components had been replaced by hydrolysates of bagasse. After a few generations in the modified medium, the bacteria again showed high glucose-isomerase activity. High fructose syrup has now been produced on a lab. scale, by using immobilized **Lactobacillus** cells containing glucose-isomerase activity. Desirable levels of fructose have been produced by recycling the concn. from corn and bagasse. KMD

271 SRINIVASAN (S). Practical method to assess factory performance. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986, M142-M157

An easy method of checking on sugar recovery in a cane sugar factory is by determining the Brix of the first expressed juice at random intervals. These values can then be compared with the regular analytical values obtained in the lab. The Pol and recovery factor, can easily be worked out. Day to day figures are only estimated recoveries; a wk. collection of figures can throw a clearer light on the working of the factory. KMD

272 SRIVASTAVA (KK), NARASIMHAM (R) and BAJPAI (PK). Spacing in relation to growth, yield and juice quality of sugarcane. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**. Oct. 1986, Ag84-Ag93.

Effect of spacing on the number of stalks per plant, and of N fertilization (0, 150, 300 and 400 kg N/ha) on the height of the plant were studied. The highest cane wt. per unit area was found when the planting density was 3500-5000 sq. cm per plant. The optimum spacing for highest economic cane yield was 4600 square cm/plant. Juice quality (Brix, pol % juice and purity coefficient) increased up to 300 kg N/ha beyond which the juice quality declined. Quality attributes were also inferior at closer spacing. KMD

273 SRIVASTAVA (SK) and SHUKLA (RP). Studies on the clarification of juices with settling aids "MORARFLOC A-40 H". **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986, M1-M14

The flocculating efficiency of Morarfloc A-40 H, an anionic polyacrylamide-based Indian flocculant was tested in the lab. with limed and sulphited juice. An active surfactant of a larger molecular size was more efficient than smaller polymers. The optimum dose of the flocculant was found to be 3-4 p.p.m; it helps to increase settling rates, clarity of juice, compactness of mud, and removal of gums. Morarloc A-40 H was found to be superior to Separan AP-30. KMD

274 THANGAMUTHU (P). Utilization of bagasse for the production of protein-rich edible mushroom. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986; G21-G35

Edible mushrooms (**Pleurotus sajor-caju**) have been grown on bagasse, paddy straw, and paper waste as substrates. The yield obtained from a bagasse bed was greater than the yield from a bed of paddy straw as bagasse has a higher cellulose content. The taste and odour of mushrooms grown on bagasse were superior to those of mushrooms grown on paddy straw or paper waste. KMD

275 VIJAY KUMAR, MEHRA (PL), SHARMA (SK) and GOSWAMI (RN). Post-harvest deterioration studies in **Beta vulgaris**, with special reference to the moisture loss and effect of non-sugar impurities on the processing quality of beet-root. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986; Ag 125-Ag133

Sugar beet were harvested on 1st, 15th, 30th April and 15th May and stored in the field for 0, 24, 48 and 72 h. Loss of sugar in beet root increases with intensity of respiration, which, in turn, increases with temp. Delayed harvesting of beet root (say after 1st wk of April) and storage in the field for 72 h reduced root yield by 38.40%. Post-harvest sugar loss in beets was significantly reduced when the beets were covered with beet-root tops. The best processing quality of beet roots is obtained, when they are harvested in the 2nd to 3rd wk of April, and processed on the same day, or within 24 h after harvest. KMD

Massecuities

276 KRISHNA MOHAN (NR). An improved three massecuite boiling system. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India.** Oct. 1986, M44-M59

The improved three massecuite boiling system described here is claimed to be the easiest and quickest way to improve exhaustibility of final molasses, and to increase the recovery of high quality sugar, using the existing equipments. KMD

277 MAID (DN). Automatic pan boilings. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986; M60-M70

An automatic pan boiling system, including control equipments, has been installed in a progressive agro-industrial complex, and showed many advantages, such as reduction in strike time by 5%; possibility of boiling massecuite from false grain agglomerates and dust; maintenance of desired consistency in the massecuite; possibility of max. crystal growth; sugar crystals remain hard throughout boiling, so that pan boiling can be done safely even at reduced purities; and reduction in the work load of a worker, so that he becomes more attentitive and efficient. KMD

278 SHARMA (SC), AGARWAL (SKD), JAIN (BC) and SEN GUPTA (SK). Increasing the exhaustibility of final massecuites by use of Pan Thril S Mark-I. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986; M96-M104

Full-scale factory trials showed marked improvements in the boiling characteristics of B and C massecuites and molasses, when Pan Thril 5 Mark I was used in three different sugar works. The time required for boiling and purging was reduced by 25-30%. The Brix of massecuites and molasses also increased. KMD

279 SINGH (KP). New technique for continuous centrifugal machines for high grade massecuites curing. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986; M85-M89

To avoid crystal breakage during continuous centrifugation, the author has applied a counter-force, by means of air pressure, to reduce the velocity of the sugar crystal. Thus, it has become possible to use continuous centrifugal machines for curing of high grade sugar, and production of bagging sugar. KMD

Molasses

280 AGARWAL (SKD). A new phenomenon of rapid determination of sugarcane molasses during storage, and its control. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. of India**, Oct. 1986; C1-C5

Bacterial contamination caused rapid deterioration of molasses during storage at its original Brix value - from 90 to 80 within one wk. while total sugars declined from 50 to 40%. The thick film of fungi was found floating on top of the molasses. Further deterioration was prevented by addition of Antifoam Special-7421, a commercial product which was earlier used to control spontaneous combustion of molasses. The treatment completely arrested microbial growth, and cleared the surface of the molasses. KMD

281 CHINNASWAMY (AP) and KALIAYAMURTHY (S). Exhaustion of final molasses. **Proc. 49th Ann. Conv. Sugar Technol. Assoc. India**, Oct. 1986, M117-M127

An all-time international record of final molasses purity of 24.5 to 25.5 has been achieved by adopting proper boiling, cooling, reheating, curing techniques and continuous centrifugals. But proper care has to be taken while planning the layout of the pan, crystallizer, and centrifugal stations, if this achievement is to be repeated in other factories. KMD

Honeys

282 SPORNS (P), KWAN (S) and ROTH (LA). HPLC analysis of oxytetracycline residues in honey. **J. Food Prot.** 49(5); 1986; 383-8

Oxytetracycline (OTC), also known commercially as Terramycin, was determined to be more stable in honey than in buffered aqueous solutions at similar pH values and temp. A rapid high performance liquid chromatography (HPLC) method was developed to detect and quantitate OTC using a 1:1 dilution (wt/wt) of honey samples in water. Using 355 nm as the wavelength of detection, amounts as low as 0.5 µg/ml could be detected in the above solution. The limits of detection were lowered considerably by a double extraction procedure. AA

Confectionery

283 ANON. Computerised production of confectionery. **Conf. Prod. 52**(7); 1986; 474-5

284 CUMMINGS (WAW) and WHITEHEAD (PD). An innovative new ingredient for the sugar confectionery industry. **Conf. Prod. 52**(7); 1986; 447,449

Application of hydrolysed whey syrup in sugar confectionery products is highlighted. BV

285 RIEDEL (HR). Confections based on gum arabic. **Conf. Prod. 52**(7); 1986; 433-4, 437

Chocolates

286 HEEMSKERK (R). Chocolate compound and coating engineering. **Conf. Prod. 52**(7); 1986; 467-73

This paper deals with chocolate flavoured coatings; coating engineering criteria; ingredients for coating, fats, bulking agents, white ingredients, brown ingredients, additives and processing. BV

287 TSCHEUSCHNER (HD) and MARKOV (E). Instrumental texture studies on chocolate I. Methods of measurement and texture characteristics. **J. Texture Stud.** 17(1); 1986; 37-50

Instrumental methods to analyze texture of plain chocolates and milk chocolate are reviewed. Using a strength testing apparatus and special measuring cells a method to determine the compression strength, shear strength and rupture force during hesion testing are described. By means of a modified penetrometer equipped with a recording device the melting properties were determined. To determine the maximum value of size of disperse components a modified precision thickness testing instrument is applied. The methods offer good reproducibility. The influence of some measuring parameters and sources of error are explained. AA

Jellies

288 ANGALET (SA). Evaluation of the Voland-Stevens LFRA texture analyzer for measuring the strength of pectin sugar jellies. **J. Texture Stud. 17**(1); 1986; 87-96

BAKERY PRODUCTS

289 SCHRADER-OLMS (B), SEIBEL (W) and PFEILSTICKER (K). Analytical, dough-rheological and baking studies for optimization of the wheat flour baking test. Part 2. Procedure of the optimized Rapid-Mix-Baking Test. **Getride Mehl Brot. 40**(4); 1986; 116-8 (De)

An exact working procedure for conducting the optimized Rapid-Mix-Baking test has been formulated, along the lines of an ISO model. KMD

Biscuits

290 ASHRAF (HRL) and SIANDWAZI (C). Evaluation of gingerbread cookies supplemented with sunflower protein concentrate. **J. Food Sci.** 51(4); 1986; 1102-3

The protein content, baking, physical and sensory characteristics of gingerbread cookies supplemented with sunflower protein conc. were examined. Protein content increased from 7.2 to 15.9% as the substitution level increased from 0 to 30%. Supplementation resulted in higher moisture loss during baking and more compact inner structure of the cookies. Although the texture of supplemented cookies was slightly crispier and harder, evaluation showed that sensory characteristics were not significantly affected by the sodium of sunflower protein conc. AA

MILK AND DAIRY PRODUCTS

291 BRODSKY (JA) and GROOTWASSINK (JWD). Development and evaluation of whole-cell yeast lactase for use in dairy processing. **J. Food Sci. 51**(4); 1986; 897-903

A low-cost industrial grade lactase was developed for one-time use in dairy products. The preparation contained the entire biomass of a selected hyperproducing strain of the yeast **Kluyveromyces fragilis.** Intracellular lactase was made freely accessible to its substrate by permeabilization of the cell membrane with food compatible reagents. In 0.1M phosphate plus 0.4% methyl paraben, permeabilization was complete in 0.5-1 h at 50°C, with 90% activity recovery from 180 g/L of cells. Whole-cell lactase contained no viable cells and was free of proteolytic activity. Its pH optimum of 5.6-6.0 proved suitable for lactose hydrolysis concurrent with cottage cheese fermentation. Hydrolyzed whey was used in ice cream and bakers' yeast production. AA

292 EL SODA (M), DESMAZEAUD (MJ), LE BARS (D) and ZEVACO (C). Cell-wall-associated proteinases in **Lactobacillus casei** and **Lactobacillus plantarum. J. Food Prot. 49**(5); 1986; 361-5

293 GRAF (TF). Effect of imitation or filled dairy products. Impacts on the consumption of Dairy products. **J. Dairy Sci.** 69(5); 1986; 1462-9

294 McDONALD (WF). Impact on the consumption of Dairy products. Impact of advertising on consumption. **J. Dairy Sci. 69**(5); 1986; 1470-75

Milk

295 BOYNTON (RD). Impact on the consumption of dairy products. Effects of milk solids content on consumption of milk. **J. Dairy Sci. 69**(5); 1986; 1454-61

296 ECHOLS (RE), MILLER (RH) and FOSTER (W). Analysis of thiamine in milk by gas chromatography and the nitrogen-phosphorus detector. **J. Dairy Sci. 69**(5); 1986; 1246-9

297 JACOBSON (RE). Impacts on the consumption of dairy products. Review of current and future consumption trends for milk and dairy products. **J. Dairy Sci. 69**(5); 1986; 1447-53

298 MARZIALI (AS) and NG-KWAI-HANG (KF). Relationships between milk protein polymorphisms and cheese yielding capacity. **J. Dairy Sci. 69**(5); 1986; 1193-201

299 TALWAR (AK) and KHANNA (AK). Effectiveness of statistical quality control techniques in moisture control of spray-dried milk powders. **ISI Bull. 38**(1); 1986; 360-363

This paper describes the three studies conducted with the application of statistical quality control techniques for standardizing the process average moisture content of 3.0% in spray-dried milk powder and to avoid the reprocessing to lower the moisture content. In the first study 84.7% of the milk powder was < 3.6% moisture (3.5% is the company stipulation) and only 15.3% which were > 3.6% moisture needed reprocessing. In the second study the process average was reduced from 3.3 to 3.2% by properly adjusting the feed rate of the spray-drier and only 1.8% had moisture content > 3.6% which needed reprocessing. In the third study the process average moisture was reduced to 2.9% by controlling the feed rate and 99.6% of the milk powder was < 3.6% moisture, and only 0.4% needed reprocessing. By this for every 100 tonnes of product the resultant gain of about 405 tonnes of product amounting to Rs. 8,100 was realised by not resorting to reprocessing and for a dairy processing 2500 t/yr the total savings would be Rupees 200,000.

300 VEDAMUTHU (ER) and NEVILLE (JM). Involvement of a plasmid in production of ropiness (Mucoidness) in milk cultures of **Streptococcus cremoris** MS. **Appl. Environ. Microbiol. 51**(4); 1986; 677-682

Evidence for the involvement of plasmid DNA (Muc plasmid) in the expression of Muc$^+$ phenotype in **S. cremoris** MS has been reported. Data are also presented which demonstrate the conjugal transfer of the Muc plasmid from a ropy **S. cremoris** to a nonmucoid (Muc$^-$) **S. lactis** and the resultant mucoid **S. lactis** transconjugant to a malty variant of **S. lactis**. The expression of Mu$^+$ phenotype was observed in all transconjugants containing Muc plasmid. MVG

Butter

301 LUBY (JM), GRAY (JI) and HARTE (BR). Effects of packaging and light source on the oxidative stability of cholesterol in butter. **J. Food Sci. 51**(4); 1986; 908-11

Oxidative stability of cholesterol in butter exposed to fluorescent light was examined for effects of packaging material. Cholesterol oxidation was prevented by after 15 days exposure. Other materials like margarine wrap, opaque parchment, wet strength dry wax paper and polyethylene film were not effective. The results indicate that oxidation of cholesterol occurred via singlet O attack as well as free radical mechanisms. Oxidation in butter in day light at 22 C was at a greater rate than fluorescent room light. Oxidation products were detectable in some samples after 2 weeks but concentrations were very low and restricted positive identification by the analytical procedure employed in the study. MVG

302 LUBY (JM), GRAY (JI), HARTE (BR) and RYAN (TC). Photooxidation of cholesterol in butter. **J. Food Sci. 51**(4); 1986; 904-7, 923

Oxidation of cholesterol occurred on exposure to fluorescent light; the oxidation products were detectable only after prolonged exposure. Oxides of cholesterol were more concentrated at the surface than throughout the entire butter block and were detectable after 8 days of exposure. Among the oxidation products detected were 5-cholesten-3β, 7α-diol and its 7β-epimer, products of free radical attack on cholesterol, along with a compound suspected to be 6-cholesten-3β, 5α -diol which is only known to form following singlet oxygen attack on cholesterol. MVG

Cheese

303 AMANTEA (GF), SKURA (BJ) and NAKAI (S). Culture effect on ripening characteristics and rheological behaviour of cheddar cheese. **J. Food Sci. 51**(4); 1986; 912-8

More than 2 million Kg of cheddar cheese was produced on continuous cheese making equipment using for over 10 months six defined strains of bacteriophage-insensitive **Streptococcus cremoris** grown in whey-based starter media. In this cheese flavour development was less than in cheese made with conventional bulk starter. Proteolysis in the trichloroacetic acid (TCA) soluble fraction in former cheese was less than that in the latter. The mechanical process affected texture, moisture content and yield point of the cheese - casein proteolysis, age, culture type and firmness were the most discriminating variables affecting maturity. MVG

304 BRAUN (SD) and OLSON (NF). Microencapsulation of cell-free extracts to demonstrate the feasibility of heterogeneous enzyme systems and cofactor recycling for development of flavour in cheese. **J. Dairy Sci. 69**(5); 1986; 1202-8

In this study a single cell free extract (CFE) system was incorporated into cheese to test the feasibility of recycling a cofactor nicotinamide adenine dinucleotide/reduced nicotinamide adenine dinucleotide (NAD/NADH) with such a system in generating several flavour compounds simultaneously was demonstrated. MVG

305 SODA (ME). Acceleration of cheese ripening: Recent advances. **J. Food Prot. 49**(5); 1986; 395-9

Discusses: Effect of elevated ripening temp. addition of enzymes; use of slurry systems; and recent progress in accelerated ripening. BSN

Ice cream

306 NIELSEN (V). Small-scale, high-quality ice cream production. **Food Technol. N. 21**(3); 1986; 49, 51

Details of the process and the equipment are given. KAR

Whey

307 BARKER (CM) and MORR (CV). Composition and properties of spherosil-QMA whey protein concentrate. **J. Food Sci. 51**(4); 1986; 919-23

Whey protein conc.(WPC) was prepared from cheese whey using

Spherosil-QMA process. With this process about 64% of proteins from whey was recovered as a 63% protein WPC. The WPC contained about 20.8% lactose, glucose and galactose. The solubility of WPC proteins ranged from about 32-42% as a function of pH 3-7 and the proteins appeared to have undergone substantial denaturation by HPLC but not by polyacrylamide gel electrophoresis. The gelation properties of WPC compared with those of commercial and ultrafiltration WPCs as a function of pH 3-7.5 and 0.0-0.15M NaCl and $CaCl_2$. The WPC did not function well as egg replacer in model cake and custard formulations. MVG

308 REXROAT (TM) and BRADLEY (RL) Jr. Acceptance of frozen desserts made with concentrated, decolourized, deionized hydrolyzed whey permeate. **J. Dairy Sci. 69**(5); 1986; 1225-31

Yoghurt

309 TOBA (T), ARIHARA (K) and ADACHI (S). Quantitative changes in oligosaccharides during fermentation and storage of yoghurt inoculated simultaneously with starter culture and β-galactosidase preparation. **J. Dairy Sci. 69**(5); 1986; 1241-5

Low lactose yoghurt was manufactured by simultaneous inoculation with β-galactosidase of **Aspergillus oryzae** from two commercial sources and yoghurt starter culture. Addition of 4.76 units enzyme/100 ml resulted in 64 and 58% depletion of the lactose by the two enzyme preparations compared with 35% in control yoghurt at 8 h. Lactose was completely hydrolyzed with 93 units enzyme/100 ml in the same period. With 4.7 units/100 ml from our preparation, the oligosaccharide percentage reached its max value of 15% of the total sugar in 2 h, slightly decreased to 12% after 8 h, and was 7% after 10 days storage at 5°C. The oligosaccharide percentage with 4.7 units/100 ml from the other preparation was 4 to 8% of the total sugar during fermentation and storage. The oligosaccharide content in low lactose yoghurt was 4 to 19 times higher than that obtained with the control yoghurt (0.3 to 1.7%). AA

MEAT AND POULTRY

Meat

310 BIANCO (L), DAGNA (L) and MARUCCHI (M). Chlorine in food processing: Use, action, and residues in meats. **Ind. Aliment. 25**(1); 1986;l 11-8, 24 (It)

After a general description of the use of chlorine as a disinfectant in food industries, the authors have described a recent method that is used in slaughterhouses for propylactic purposes. Various food technological and toxicological aspects of chlorine contamination have been discussed. Some experimental results obtained with chloramine-T have been reported. The include alterations that are caused by chlorine in meat foods, and the probable residues that may be found therein. KMD

311 KORKEALA (H), MAKI-PETAYS (O), ALANKO (T) and SURVETTULA (O). Determination of pH in meat. **Meat Sci. 18**(2); 1986; 121-32

The pH of 80 beef and 120 pork muscles was determined electrometrically using different electrode systems and different presentations of samples: that is, directly from the muscle, from a meat-water mixture and from a meat homogenate. The results showed statistically significant differences ($P < 0.001$). Differences between electrodes appear to be greater than the differences due to the different presentations of the meat samples. Certain methods gave systematically lower or higher pH values than others. On the other hand, these differences were not very large and the repeatability of each method was low. On the basis of the results, however, no pH measurement method could be considered better than the others. AA

312 LEE (YB). Early-postmortem measurements and conditioning in assessing and enhancing meat quality. **J. Animal Sci. 63**(2); 1986; 622-32

Recent studies on the relationships of early-post mortem conditions and of newly proposed quality indicators to meat palatability are reviewed. The possible application of these new concepts to enhance meat quality is also discussed. MVG

313 MacDOUGALL (DB). The chemistry of colour and appearance. **Food Chem. 21**(4); 1986; 283-99

The chemistry of colour and appearance is reviewed with emphasis on meat colour. KAR

314 SANO (T), NOGUCHI (SF), TSUCHIYA (T) and MATSUMOTO (JJ). Contribution of paramyosin to marine meat gel characteristics. **J. Food Sci.** 51(4); 1986; 946-50

The properties of the paramyosin-natural actomyosin system gels were considerably improved by paramyosin, and a strong and firm gel was formed. This effect of paramyosin on gel properties was large at relatively low paramyosin contents. Paramyosin considerably altered the characteristic texture of the marine meat gel products made from invertebrate meats. Two-stop heating, including the low temp. setting was effective in increasing the gel strength for the paramyosin-natural actomyosin system gels. The strengthening effect of setting on the gel strength became larger on increasing the paramyosin content. AA

315 TOPEL (DG). Future meat-animal composition: Industry adaptation of new technologies. **J. Animal Sci. 63**(2); 1986; 633-41

Meat products

316 COMER (FW), CHEW (N) and LOVELOCK (L). Comminuted meat products: Functional and microstructural effects of fillers and meat ingredients. **Can. Inst. Food Sci. Technol. J.** 19(2); 1986; 68-74

The functional and microstructural effects resulting from the addition of wheat flour, modified corn starch, skim milk powder, soy conc. and wheat gluten at levels of 6.8% solids were examined and compared with an all-meat control product. All fillers improved stability and textural firmness. Examination of the microstructures by light, scanning electron (SEM) and transmission electron (TEM) microscopy indicate that the comminuted meat products were mechanical mixtures in which the microstructural features of individual starch and protein components were revealed. There was evidence of interaction between soluble meat and vegetable proteins and the restriction of starch gelatinization due to limited moisture availability. The fillers appeared to increase the frequency of fat agglomeration while improving stability. This is further evidence that water absorption and gelation phenomena play a greater role than emulsion formation in determining the stability of a comminuted meat system. AA

317 TROUT (GR) and SCHMIDT (GR). Water binding ability of meat products: Effect of fat level, effective salt concentration and cooking temperature. **J. Food Sci. 51**(4); 1986; 1061-2

Effect of fat level (5 and 30%), effective salt (NaCl) concn (1.33-3.73 %) and cooking temp. (56-80°C) on water binding ability (WBA) of a finely comminuted meat product was investigated. Fat level had little concn on WBA as compared to effective salt concn. The effective salt concn determined the max. temp. to which the product could be heated before WBA started to decrease. These max. temp. ranged from 57 C at the lowest salt concn. to 68°C at the highest. The decrease of WBA with increasing temp. was also determined by salt level. The rates ranged from −1.3% per°C at the lowest concn to −0.3 % per°C at the highest. No beneficial effect on WBA was observed with increasing salt concn. above 2.3%. MVG

Beef

318 LAMKEY (JW), MANDIGO (RW) and CALKINS (CR). Effect of salt and phosphate on the texture and colour stability of restructured beef steaks. **J. Food Sci. 51**(4); 1986; 873-5, 911

319 OTTO (E). On the fat content of beef and pork (Part 2 and conclusion). **Ernahrungsforschung. 31**(2); 1986; 46-8 (De)

The proportions of fat and protein in the meat from different parts of beef and pork carcasses have been reported in the form of diagrams and tables. The same data have been given for the whole carcasses of the different types and sizes of beef animals, and of pigs of different sizes. KMD

320 PATERSON (BC) and PARRISH (FC) Jr. A sensory panel and chemical analysis of certain beef chuck muscles. **J. Food Sci. 51**(4); 1986; 876-9, 896

321 RAY (EE), FARRELL (C) and HOOD (DE). Influence of electrical stimulation and conditioning periods upon hot-boned cooked beef semitendinosus roast. **J. Food Prot. 49**(5); 1986; 355-60

322 WELKE (RA), WILLIAMS (JC), MILLER (GJ) and FIELD (RA). Effect of cooking method on the texture of epimysial tissue and rancidity in beef roasts. **J. Food Sci. 51**(4); 1986; 1057-8, 1060

Cattle

323 BRUSON (DE), HUNT (MC), UNRUH (JA) and DIKEMAN (ME). Proportion of types I and III collagen in **Longissimus** collagen from bulls and steers. **J. Animal Sci. 63**(2); 1986; 453-6

Results of the investigation indicate that the proportion of type I and III collagen does not relate well to tenderness differences between bull and steer **Longissimus** muscles. The observed differences in tenderness, heat solubility and percentage of collagen is attributed to some other myofibrillar connective tissue parameter. Collagen characteristics, such as extent and type of cross linking and the fibre size for each collagen type, may play role in tenderness differences between muscles from bulls and steers. MVG

324 STIFFLER (DM), GRIFFIN (CL), SMITH (GC), LUNT (DK) and SAVELL (JW). Effects of electrical stimulation on carcass quality and meat palatability traits of charolais crossbred bulls and steers. **J. Food Sci. 51**(4); 1986; 883-5

Bovines

325 LUNDBERG (P), VOGEL (HJ) and RUDERUS (H). Carbon-13 and proton NMR studies on post-mortem metabolism in bovine muscles. **Meat Sci. 18**(2); 1986; 133-60

Offal

326 GOMES AREAS (JA). Effect of lipid-protein interactions on hydration characteristics of defatted offal protein isolates. **J. Food Sci. 51(4); 1986; 880-82**

The influence of defatting offal protein isolates with solvents of increasing polarity on the interaction between proteins and water was studied by water vapour isotherms. MVG

Goats

327 BABIKER (SA) and BELLO (A). Hot cutting of goat carcasses following early post-mortem high temperature ageing. **Meat Sci. 18(2)**; 1986; 111-20

Hot cutting of goat sides with bone-in joints 3 h after the sides were left hanging at an ambient temp. of 34°C with (treatment II) or without (treatment I) subsequent chilling prior to freezing did not adversely affect, meat colour, tenderness, cooking loss or water holding capacity as compared with normal chilling (Treatment III). Treatment III significantly, increased evaporative wt. loss from the sides. No significant differences were found between treatments I ad II in colour, shear force, evaporative wt. loss, cooking loss, drip loss from the leg joint, and water holding capacity. Results indicated that in countries with ambient temp. above 30°C, goat sides or carcasses canbe hot cut after a 3 h hanging at ambient temp. and subsequent freezing without deterioration in the quality or processing properties of the meat. MVG

Lamb

328 SHORTHOSE (WR), POWELL (VH) and HARRIS (PV). Influence of electrical stimulation, cooling rates and aging on the shear force values of chilled lamb. **J. Food Sci. 51**(4); 1986; 889-92, 928

An investigation using high voltage (800 VRMS, 1140 V peak at 14.3 Hz) electrical stimulation (ES) showed that lambs should be stimulated within 30 min of slaughter for 60-120 sec for max. effect on Warner-Bratzler shear force values. Shear force values of lamb muscles chilled at different rates were significantly ($P < 0.001$) reduced by ES, compared with nonstimulated controls. However, aging at temp. between 0 and 9°C, for only 2-3 days, reduced shear force values of nonstimulated lamb subjected to moderate chilling rates to those of ES samples at 1 day postmortem. Increasing aging temp. significantly ($P < 0.001$) increased aging rate but duration of aging had the greater effect. AA

Pork

329 FJELKNER-MODIG (S) and TORNBERG (E). Intramuscular lipids in **M.longissimus dorsi** from pork, as related to breed and sensory properties. **J. Food Quality.** 9(3); 1986; 143-60

The content as well as the fatty acid composition of the intramuscular lipids,were influenced by breed and sex and most probably also by genetic factors. The intramuscular lipids were mainly found in fat depots containing 20 to 150 fat cells. The description of the fat cells is given. KAR

330 GRANT (GF) and McCURDY (AR). Effect of curing agents on the growth of **Lactobacillus viridescens** in model meat systems. **Can. Inst. Food Sci. Technol. J.** 19(2); 1986; 78-81

A model system consisting of pork hearts and MRS agar (Oxoid), was developed to detect microbial greening caused by **Lactobacillus viridescens.** The model system was used to study the effect of sodium nitrite, sodium chloride or sodium erythorbate as well as combinations of these curing agents on microbial greening. A sodium chloride concn of 6% prevented greening but this level is twice the acceptable sensory limit in cured meats. At the levels tested no other curing agents alone or in combination with other agents prevented this type of microbial greening. The ability of curing agents to inhibit the growth of **L. viridescens** was also investigated using MRS broth suspension. At 500 p.p.m. $NaNO_2$; the max. bacterial growth was 53% of the control (0 p.p.m. $NaNO_2$; at 6% NaCl the growth was only 17% of the control (0% NaCl); while at 1800 p.p.m. sodium erythorbate the growth was 95% of the control sample. When the curing agents were used combined near the normal usage levels, sodium erythorbate in combination with NaCl and $NaNO_2$ was more effective in retarding the growth of **L. viridescens** than when used alone. AA

331 MARRIOTT (NG), KORZON (JM), BOLING (JW) and GRAHAM (PP). Effects of adjuncts on restructured pork. **J. Food Quality. 9**(3); 1986; 185-97

Boneless pork shoulders were excised 24 h postmortem, frozen, tempered, flaked and blended with one of the four formulations: (1) 1% NaCl and 0.25% sodium tripolyphosphate (STP); (2) 0.5% NaCl, 0.5% KCl and 0.25% STP; (3) 1% NaCl, 0.25% STP and 0.125% lecithin; or (4) 0.5% NaCl, 0.5% KCl, 0.25% STP and 0.125% lecithin. The blended samples were converted to restructured chops and stored at -18 C until evaluated at 5, 14 and 56 days. Appearance and taste attributes were measured objectively and subjectively. Objective and subjective measurements of colour and other visual traits revealed that storage time affected these traits more than the adjuncts; whereas, all treatments had a minimal effect on texture and juiciness. Increased frozen storage time and lecithin contributed to flavour degradation and increased TBA values. Further research is needed to determine the effect of varying amounts of lecithin on oxidative rancidity of restructured muscle foods. AA

332 MOLLER (AJ) and VESTERGAARD (T). Effects of altered carcass suspension during rigor mortis on tenderness of pork loin. **Meat Sci. 18**(2); 1986; 77-87

Thirty two porcine carcass from two Danish breeds were evaluated for the effect of altered carcass suspension on Warner-Bratzler (WB) shear force, sarcomore length myofibrillar fragmentation and cooking loss in **L. dorci** muscle. Pelvic suspension decreased WB values and increased sarcomere lengths while cooking loss was unaffected by method of suspension. It was also shown that the tenderising effect of pelvic suspension increased with increasing WB level in the conventional suspended carcass sides. Myofibril fragmentation showed inconsistent response to suspension method. MVG

333 POSTE (LM), WILLEMOT (C), BUTLER (G) and PATTERSON (C). Sensory aroma scores and TBA values as indices of warmed-over flavour in pork. **J. Food Sci. 51**(4); 1986; 886-8

Swine

334 CURRIER (M), SINGLETON (M), LEE (J) and LEE (DR). **Salmonella** in swine at slaughter: Incidence and serovar distribution at different seasons. **J. Food Prot. 49**(5); 1986; 366-8

Bacon

335 SKINNER (GE) and RAO (VNM). Effect of sample weight and orientation in the shear press testing of Canadian style bacon. **J. Food Sci. 51**(4); 1986; 893-6

Ham

336 MAGNUS (CA), INGLEDEW (WM) and McCURDY (AR). Thermal resistance of **Streptococci** isolated from pasteurized ham. **Can. Inst. Food Sci. Technol. J. 19**(2); 1986; 62-7

Streptococcus faecium and **Streptococcus faecalis**, two examples of thermoduric spoilage organisms from perishable cured meats, were isolated from pasteurized canned hams and tested for heat resistance using the multiple point method. Known cell concn were inoculated into two tempered liquid menstrua (Sorenson's buffer and a derived ham broth), and exposed to variety of heating temp. Survivor curves, phantom thermal death time curves, D values, and z values were determined. Time-temp. relationships of interest to industry were obtained, and it was found that **Streptococcus faecium** was more heat resistant than **Streptococcus faecalis**. Four of the six organisms tested were more resistant in the ham menstrum than in the buffer. AA

Chickens

337 ANG (CYW). Effect of further processing and storage of mechanically deboned chicken on proximate composition, thiamin, riboflavin and TBA values. **J. Food Sci. 51**(4); 1986; 861-4

In mechanically deboned chicken (MDBC), vitamin concn were found stable when stored at 2°C for 2 days or -18°C for 180 days. In Frankfurters (FF) and bolgnas (BG), processing reduced the vitamin levels by 0-12% on a dry wt. basis. Storage for 42 days at FF and BG at 2°C and for 180 days at -180°C had no measurable changes in vitamin content. TBA values were generally low except their increases were significantly in salted MDBC stored at -18°C. Variations were evident in proximate composition among products but was not affected by storage time and temp. MVG

338 DUNCAN (IJH), SLEE (GS), KETTLEWELL (P), BERRY (P) and CARLISLE (AJ). Comparison of the stressfulness of harvesting broiler chickens by machine and by hand. **Br. Poult. Sci. 27**(1); 1986; 109-14

Quails

339 TSERVENI-GOUSI (AS) and YANNAKOPOULOS (AL). Carcase characteristics of Japanese quail at 42 days of age. **Br. Poult. Sci. 27**(1); 1986; 123-7

Turkeys

340 CREMER (ML). Sensory quality of turkey rolls roasted and held in an institutional convection oven with and without chilled storage. **J. Food Sci. 51**(4); 1986; 868-72

341 HERNANDEZ (A), BAKER (RC) and HOTCHKISS (JH). Extraction of pigments from mechanically deboned turkey meat. **J. Food Sci. 51**(4); 1986; 865-7

Eggs

342 LI-CHAN (E), NAKAI (S), SIM (J), BRAGG (DB) and LO (KV). Lysozyme separation from egg white by cation exchange column chromatography. **J. Food Sci. 51**(4); 1986; 1032-6

SEAFOODS

Fish

343 DANIELS (JA), KRISHNAMURTHI (R) and RIZVI (SH). Effects of carbonic acid dips and packaging films on the shelflife of fresh fish fillets. **J. Food Sci. 51**(4); 1986; 929-31

Cod fillet samples dipped in carbonic acid and then stored packaged and unpackaged at 2 C were evaluated for wt. loss, surface pH, texture changes, surface microbial growth, headspace gas composition and sensory characteristics of cooked flavour, odour, and appearance. Carbonic acid extended shelf life between 7 and 21 days, though only at a quality level judged as fair to marginal by sensory evaluation. Low permeability packaging slowed bacterial growth and extended shelf life but retained off-odours and established low oxygen conditions which may present a risk from the growth of pathogenic organisms. MVG

344 HSIEH (RJ) and KINSELLA (JE). Lipoxygenase-catalyzed oxidation of N-6 and N-3 polyunsaturated fatty acids: Relevance to and activity in fish tissue. **J. Food Sci. 51**(4); 1986; 940-45, 996

This investigation has demonstrated that lipoxygenase is present in fish skin tissue and can oxidise polyunsaturated fatty acids to produce specific hydroperoxides which may then decompose to produce short chain carbonyls to result in fish oxidative off flavour. It is suggested that further studies be taken up to study the role and extent of lipoxygenase-catalysed PUFA oxidation in fish in order that more effective methods to prevent lipid peroxidation can be developed. MVG

Cod

345 WOYEWODA (AD) and BLIGH (EG). Effect of phosphate blends on stability of cod fillets in frozen storage. **J. Food Sci. 51**(4); 1986; 932-5

Effects of two commercial tripoly or metaphosphate blends on sensory quality and chemical changes in cod fillets stored at -12°C (to encourage enzymatic production of dimethylamine/formaldehyde (DMA/HCHO) with associated decrease of protein extractability) or at -30°C with daily fluctuation to -26°C (to produce freezer burn without undue enzymatic changes) were studied. At both temp. phosphate treatments reduced thaw drip and cooked drip; at -30° C no significant difference was found between treated and control samples. Phosphate treatment lowered salt extractable protein, but did not affect DMA/HCHO formation. Sensory evaluation of fillets stored at -30°C revealed that the treated ones to be the most tender, and after 26 wk storage, the most highly acceptable. Tripolyphosphate treatment retarded the increase of expressible fluid under abusive conditions of frozen storage. MVG

Hake

346 BUCK (EM), BORHAN (M), HULTIN (HO) and DAMON (RA) JR. Changes in texture and flavour of red hake sticks as affected by frozen storage form. **J. Food Sci. 51**(4); 1986; 1063-4

Red hake (**Urophycis chuss**) was processed into frozen blocks from which sticks were made at various times so that the samples tested had been stored at -18 C either as sticks or blocks or a combination of the two over a 9-month period. Sensory panelists found highly significant differences ($p < 0.001$) among storage periods (3,6,9, months) for both flavour and texture. Storage form (stick or block), however, had little apparent effect on changes in flavour and texture. Cooking method had a significant effect on flavour ($p < 0.05$) and on texture ($p < 0.001$). Warner-Bratzler shear measurements were shown. AA

Surimi

347 KIM (BY), HAMANN (DD), LANIER (TC) and WU (MC). Effects of freeze-thaw abuse on the viscosity and gel-forming properties of surimi from two species. **J. Food Sci. 51**(4); 1986; 951-6, 1004

The effects of cyclic freezing and thawing upon the quality of frozen surimi of two species were studied with respect to sol viscosity, sol rigidity changes during thermal processing and structural failure properties of the cooked gel. A torsion test, used to determine the strength of gels subjected to different thermal histories, revealed that increasing the number of freeze-thaw cycles reduced the strength and deformability of both sand trout and Alaska pollack surimis. Continuous monitoring of sol rigidity during thermal processing showed little changes in thermal transition temp. caused by freeze-thaw abuse for either surimi but shifts occurred in overall rigidity levels. Particularly dramatic changes were induced in the Alaska pollack rigidity thermogram. The rigidity thermograms of sand trout and Alaska pollack were significantly different, as were their responses to freeze-thaw abuse and low temp. (4°C and 40°C) pretreatments. AA

Whitefish

348 SHARP (WF) Jr., NORBACK (JP) and STUIBER (DA). Using a new meausre to define shelf life of fresh whitefish. **J. Food Sci. 51**(43); 1986; 936-9, 959

An acceptor set size measure was successfully employed to examine shelf life trade-offs when fresh lake whitefish fillets (**Coregonus clupeaformis**) were dipped in 0.0, 2.5 or 5.0% (w/v) potasium sorbate, packaged in low, intermediate, or higher barrier bags, placed in 100% CO_2 modified atmosphere packaging system and held under refrigeration at less than 3°C. When sorbate was varied, shifts in acceptor size indicated that fillets dipped in 5.0% sorbate had the longest shelf life, exceeding 14 days. No significant difference was found when film permeability was varied. For all barrier films, shelf life exceeded 15 days although the low barrier bag had smaller acceptor sizes. AA

Shrimps

349 COOPER (PL), MARSHALL (MR), GREGORY (JF), III and OTWELL (WS). Ion chromatography for determining residual sulphite on shrimp. **J. Food Sci. 51**(4); 1986; 924-8

The method was developed and it compared favourably with the M-W method. The method is time saving and numerous shrimp samples can be prepared simultaneously by water extraction in one hour followed by a 20 min ion chromatography. MVG

350 NIOLA (I) and VALLETRISCO (M). Indole content as a quality index for shrimps. **Ind. Aliment. 25**(1); 1986; 30-34 (Italian)

Indole is a chemical indicator of decomposition for shrimps which has recently attracted much attention, sot hat FDA has proposed its use in the control of imported products. In this paper an investigation both on fresh and frozen commercial samples has been carried out, by HPLC. Results are reported. AA

PROTEIN FOODS

FRUIT JUICES AND BEVERAGES

Fruit juices

351 DIMITRIOU (M). SIGMASTAR concentration plants with aroma recovery - Operation, experience and new developments. **Flussiges Obst. 53**(5); 1986; 254-6 (De)

A detailed description is given of aroma recovery plants based on the SIGMASTAR plate evaporator. Particular mention is made of a smaller evaporator (half the original size) which can be used to set up a mobile aroma recover unit. KMD

352 LAU (O-W), LUK (S-F) and WONG (K-S). Background correction method for the determination of ascorbic acid in soft drinks, fruit juices and cordials using direct ultraviolet spectrophotometry. **Analyst. 111**(6); 1986; 665-70

353 WEHRLE (G). New pressing systems for the fruit juice industry - Design, function, experience. **Flussiges Obst. 53**(5); 1986; 237-44 (De)

Two new pressing systems - (i) the Multipress and (ii) the Belt press XP-have been described; with full technical details. The integration of these systems into existing apple juice pressing lines has also been dealt with in detail. KMD

Apple juices

354 BAUMANN (G). Microfiltration and ultrafiltration of apple juices - Comparison of inorganic/organic membranes and conventional deep-bed filters. **Flussiges Obst. 53**(5); 1986; 256-61 (De)

Membrane filtration is proving to be a sound technical alterative to conventional deep-bed filtration. At present, it is possible to produce cold sterile apple juiceon a pilot scale. Ceramic membranes, which have large pore diameters,are particularly free from clogging. Microbiologically stable juices can be produced by using membranes having a pore diameter as large as 0.2 µm. Sensory properties of membrane filtered apple juices are not inferior to those of conventionally fined and filtered juices. KMD

355 O'BEIRNE (D). Effects of pH on nonenzymic browning during storage in apple juice concentrate prepared from Bramley's seedling apples. **J. Food Sci. 51**(4);1986; 1073-4

In Bramley's Seedling, adjustment of juice pH affected darkening in apple juice conc. during storage in the order pH 2.0 > pH 3.0 > pH 4.0. Darkening was also greater in model systems corresponding to juice at pH 3.0 compared with pH 4.0. The rapid darkening in conc. of this cultivar appeared to be due to high rates of Maillard browning reactions rathern than to other forms of nonenzymic browning. AA

Citrus juices

356 LEE (HS), ROUSEFF (RL) and NAGY (S). HPLC determination of furfural and 5-hydroxymethylfurfural in citrus juices. **J. Food Sci. 51**(4); 1986; 1075-6

357 YAMASAKI (S). Citrus fruit production and processing in mainland China. **Flussiges Obst. 53**(5); 198; 262-4 (German)

China's total fruit production in 1983 was estimated at

9,480,000 t, of this, 13.7% is made up of citrus fruits, mainly mandarins. There are 28 canning plants spread over 9 Chinese provinces; their main product is canned mandarin segments, and the by-product is an orange beverage, with 2-3% fruit juice content. It is also reported that,since 1985, 4 plants - 2 each in Szechwan and Human - are producing mandarin/orange juice concentrate. KMD

Orange juices

358 CRANDALL (PG), CHEN (CS), MARCY (JE) and MARTIN (FG). Quality of enzymatically treated 72°Brix orange juice stored at refrigerated temperatures. **J. Food Sci. 51**(4); 1986; 1017-20

Fresh Valencia orange juice was treated with 0, 70, and 350 ppm of commercial petic enzymes, conc. to 72°Brix and stored at -7, -1, 7, and 13°C for up to 6 months. The 70 ppm enzyme treatment successfully reduced initial apparent viscosity by about 25%. For the 70 ppm enzyme treated samples after 6 months storage at all fourtemp. juice cloud remained acceptable, furfural remained below the significant level, and at -1°C, vitamin C levels were above 32 mg/100 mL. There was no significant difference in taste after 6 months storage at -7°C between bcontrol and 70 ppm enzyme treated samples. Product quality of enzymatically trerated orange conc. stored at refrigerated temp. was of sufficient quality to realise potential savings of 17% in storage and 30% in refrigeration. AA

359 TRAMMELL (DJ), DALSIS (DE) and MALONE (CT). Effect of oxygen on taste, ascorbic acid loss and browning for HTST-pasteurized, single-strength orange juice. **J.Food Sci. 51**(4); 1986; 1021-3

Single-strength orange juice with dissolved oxygen levels of 0.6, 1.8, 6.5 and 10.1 ppm was pasteurized at 85°C for 7 sec using a pilot-scale, high temperature-short time, tubular, heat exchanger. The product was aseptically bottled under nitrogen and stored for 5 months at 22°C.Browning and loss of ascorbic acid were linearly related to the initial oxygen concn. Based on the results of sensory evaluation,reducing the initial dissolved oxygen concn. by 94% did not extend the shelf-life of single-strength orange juice. Therefore, based on taste, deaeration will not extend the shelf-life of this product. AA

Grape juices

360 HANG (YD) and WOODAMS (EE). Utilization of grape pomace for citric acid production by solid state fermentation. **Am. J. E$nol. Vitic.** 37(2); 1986; 141-2

A solid state fermentation method has been developed and is described for citric acid production from grape pomace by **Aspergillus niger** NRRL 567. The yields of citric acid varied with the pomace varieties and were dependent on the amount of methanol present in the pomace and the fermentation time and temp. Under optimum fermentation conditions, this method reduced the pomace dry matter by about 43% and yileded more than 90 g of citric acid per kg of grape pomace fermented. The yield was more than 60% based on the amount of fermentable sugar consumed. These results suggest that the use of grape pomace for fungal production of citric acid could represent an efficient method of minimizing the pomace disposal problems and concomitantly producing a commercially valuable organic acid. AA

361 KOOKKALOS (TI). Postharvest decay control of grapes by using sodium metabisulphite in cartons enclosed in plastic bags. **Am. J. Enol. Vitic. 37**(2); 1986; 149-51

Grapes of the **Vitis vinifera** L. varieties Verigo and Mavro were kept at 1 to 2 C for three months, when 4 g of sodium metabisulphite

($Na_2S_2O_5$) were spread between sheets of greaseproof paper at the bottom of 40 × 30 × 109 cm cartons which were enclosed in plastic bags. Decay was reduced considerably, the berries were turgid, the stems remained green, bleaching of the berries by SO_2 was insignificant, and the appearance and taste of the grapes were rated as excellent. AA

362 WILSON (B), STRAUSS (CR) and WILLIAMS (PJ). The distribution of free and glycosidically-bound monoterpenes among skin, juice, and pulp fractions of some white grape varieties. **Am. J. Enol. Vitic. 37**(2); 1986; 107-11

Coffee

363 BHEEMA RAO (M), VITTAL RAO (AS), ABRAHAM (KO) and SHANKARANARAYANA (ML). Estimation of chicory in coffee-chicory mixture. **Indian Coffee. 50**(12); 1986; 13-9

The authors have modified Scliwanoff's (resorcinol) test, to measure the content of ketohexose in coffee, chicory and in their mixture and calculate therefrom the % of chicory in the coffee-chicory powder. Keto-hexose content values for 45 samples of coffee, chicory, and different proportions of coffee-chicory blends have been reported. KMD

364 SZENTE (L) and SZEJTLI (J). Molecular encapsulation of natural and synthetic coffee flavour with β-cyclodextrin. **J. Food Sci. 51**(4); 1986; 1024-7

Natural and synthetic coffee flavours werestabilized with -cyclodextrin. Upon contact with water the complex bound flavour substances were released immediately. The transformation of greasy, oily or liquid, coffee aroma concn. into a microcrystalline stable inclusion complex may have practical importance as an additive to enhance the sensory properties and quality of instant coffee products. AA

Beer

365 BRYAN-JONES (G). The preservation of distillery fermentation samples for bacteriological examination. **J. Inst. Brew. 92**(3); 1986; 253-4

A preservative mixture consisting of ammonium pentaborate (8 g/l final concentration), pootassium sorbate (0.8 g/l) and citric acid (2.4 g/l) has been developed to allow the preservation of distillery fermentation samples at room temp. for several days prior to bacteriological analysis. The mixture is dispensed as a dry powder into sterile sample containers, and silica gel crystals are included to maintain the mixture as a free running powder. Samples are then added to the vials and the vials are well mixed to dissolve the preservative. AA

366 KLOPPER (WJ), ANGELINO (SAGF), TUNING (B) and VERMEIRE (HA). Organic acids and glycerol in beer. **J. Inst. Brew. 92**(3); 1986; 225-8

Discusses: organic acids and glycerol contents in beer; organic acids and glycerol levels during the malting process; organic acid and glycerol levels during the fermentation process; organic acids and glycerol contents in Pilsener beers in comparison with end fermented worts. BSN

367 MASSCHELEIN (CA). The biochemistry of maturation. **J. Inst. Brew. 92**(3); 1986; 213-9

Discusses: Biochemical and organoleptic implications of carbohydrate metabolism in traditional maturation systems; composition and contribution of the nonvolatile fraction to flavour maturation of beer; metabolic sequences involved in flavour maturation of beer; and one tank operation of accelerated maturation and beer flavour. BSN

368 MOLL (M). Brewery quality control. **J. Inst. Brew. 92**(3); 1986; 229-31

Malts

369 ERDAL (K). Proanthocyanidin-free barley-malting and brewing. **J. Inst. Brew. 92**(3); 1986; 220-24
Discusses: plant breeding; maltilng; brewing; choice of hops; effect of proanthocyanidins; the influence of storage temperature; flavour and flavour stability; and perspectives. BSN

370 NISHIKAWA (N) and KAMADA (K). Varietal differentiation of malts by resazurin staining. **J. Inst. Brew. 92**(3); 1986; 250-52
A staining procedure for discrimination of Winter and Spring malted barleys was established by use of Redox indicator resazurin. Three representative European Winter cv., Plaisant, Gerbel and Sonja, were clearly differentiated from the Spring varieties, Carina, Europa, Aura, Atem, Kym, Triumph, Menuet, Aramir, Chevalieri and other varieties within 6 hours. Furthermore, Winter kernels mixed up arbitrarily with Spring kernels in various combinations for blind testing could be estimated with an average accuracy of 96%. AA

371 SLACK (CR), HANCOCK (DA), HASLEMORE (RM) and TUNNICLIFFE (CG). A simplified method for estimating hot water extract using small malt samples. **J. Inst. Brew.** 92(3); 1986; 262-3
A method requiring a minimum labour input is described for measuring hot water extracts of the relatively large numbers of small samples of malt that can be generated in automated micro-malted equipment. Using malts obtained from 5 g samples of grain of 11 barley cultivars, this method gave essentially the same quality ranking,with almost the same precision, as a more conventional procedure using 10 g of malt from 15 g samples of grain. AA

372 WAINWRIGHT (T), O'FARRELL (DD),HORGAN (R) and TEMPONE (M). Ammonium persulphate in malting: Control of NDMA and increased yield of malt extract. **J. Inst. Brew. 92**(3); 1986; 232-8

Brandy

373 OUGH (CS) and ALMY (J). Some volatile trace nitrogen components in California brandy. **Am. J. Enol. Vitic. 37**(2); 1986; 137-40
A number of previously unreported volatile N compounds in California brandy were determined. They fell into several categories - thiazoles, pyridines, amino acid ethyl esters, and a miscellaneous group. The compounds were quantified using internal standards. Suggestions as to treatment effects are offered as a preliminary study. All N components reported were at μg/l levels or lower. AA

Wines

374 BAKKER (J), PRESTON (NW) and TIMBERLAKE (CF). The determination of anthocyanins in aging red wines: Comparison of HPLC and spectral methods. **Am. J. Enol. Vitic.** 37(2); 1986; 121-6

375 BONORDEN (WR), NAGEL (CW) and POWERS (JR). The adjustment of high ph/high titratable acidity wines by ion exchange. **Am. J. Enol. Vitic. 37**(2); 1986; 143-8
A technique for the reduction of pH and titratable acidity (TA) in high pH/high TA dry white wine was investigated. The technique involved anion exchange with the resin (Amberlite IR-45) in the tartrate form coupled with cation exchange (Amberlite IR-120 H+) of part

of the anion-exchanged wine and blending of the two wines. The tartrate anion exchange technique reduced the pH of the wine by replacing malic acid with tartaric acid. Precipitation of the majority of the added tartrate as potassium acid tartrate decreased the TA of the wine. The efficiency of the technique depended on the malate concn. of the original wine. Sensory evaluation impliedthat the removal of flavour compounds and colour by the anion exchange resin negated the reduction int he wine's acidity. AA

376 EDINGER (WD) and SPLITTSTOESSER (DF). Sorbate tolerance by lactic acid bacteria associated with grapes and wine. **J. Food Sci. 51**(4); 1986; 1077-8

Ten strains of lactic acid bacteria capable of growth under pH and ethanol conditions similar to those of table wine were studied for tolerance to potassium sorbate in laboratory media. For all strains there was little inhibition at sorbate levels up to 300 ppm. Between 300 and 1000 ppm, inhibition of **Leuconostoc oenos** was variable among strains, and the **Lactobacillus** strains studied showed virtually no inhibition by sorbate levels up to 1000 ppm. Thus, there were significant inhibitory effects on growth of some strains in laboratory media at higher sorbate concn, but not at the commercially applied concn. of 200-300 ppm and less. AA

377 GUNATA (YZ), BAYONOVE (CL), BAUMES (RL) and CORDONNIER (RE). Stability of free and bound fractions of some aroma components of grapes cv. Muscat during the wine processing: Preliminary results. **Am. J. Enol. Vitic. 37**(2); 1986; 112-4

The stability of free and glycosidically-bound fractions of some components of Muscat grape aroma (terpenols and aromatic alcohols) was investigated during alcoholic fermentation and in wines of different ages. Some free terpenols, such as linalool, vary little during fermentation, for others, such as geraniol, the decrease is considerable. Hydrolysis of bound terpenols is low. During wine aging, and depending on the different terpenols, slow hydrolysis of terpenoid glycosides seems to occur in wine. Free linalool and α-terpineol increased while geraniol and nerol decreased in older wines. AA

378 HERESZTYN (T). Formation of substituted tetrahydropyridines by species of **Brettanomyces** and **Lactobacillus** isolated from mousy wines. **Am. Enol. Vitic. 37**(2); 1986; 127-32

379 RAMEY (D), BERTRAND (A), OUGH (CS), SINGLETON (VL) and SANDERS (E). Effects of skin contact temperature on chardonnay must and wine composition. **Am. J. Enol. Vitic. 37**(2); 1986; 99-106

Chardonnaygrapes from a single vineyard block were held after crushing for 20 to 25 hours at four different temperatures between 9°C and 30°C, pressed, and vinified separately but identically. Must samples taken at five-h intervals showed greatly increased phenolic extraction rates at higher temp, particularly of the flavonoid fraction. Wine results were similar, showing increased phenolic content in warm-skin-contact wines. Temp. control below 15°C minimized wine protein levels and bentonite requirements. Elevated macerationtemperatures produced wines of deeper colour, increased oxidative sensitivity, and coarser character which matured more rapidly during barrel aging. AA

380 SIMS (CA) and MORRIS (JR). Effects of acetaldehyde and tannins on the colour and chemical age of red muscadine (**Vitis rotundifolia**) wine. **Am. J. Enol. Vitic.** 37(2); 1986; 163-5

A red muscadine wine treated with 300 or 600 mg/L acetaldehyde had less browning, greater colour intensity, and greater chemicalage (levels of anthocyanin-tannin polymerization) than an untreated wine.

Tannic acid had no major effect on browning or chemical age, but increasedcolour intensity as compared to the control. A commercial "tannin" increased browning slightly, but did not affect colour intensity or chemical age. AA

381 TEST (SL), NOBLE (AC) and SCHMIDT (JO). Effect of pomace contact on chardonnay musts and wines. **Am. J. Enol. Vitic. 37**(2); 1986; 133-6

OILS AND FATS

382 ALVAREZ (R), DIAZ (C), HARDISSON (A) and GALINDO (L). Metallic ions (Na, K, Ca, Mg, Cu, Zn and Fe) levels in edible vegetable oils. **Rev. Agroquim. Technol. Aliment. 26**(2); 1986; 291-6 (Es)

The contents of Na, K, Ca, Mg, Cu, Zn and Fe in various edible vegetable oils were determined, in order to know their normal values and, in the case of Cu and Fe, for controlling their concn. because their contents are legally fixed as residues of heavy metals. In other hand, the ratio Na/K, Ca/Mg, Fe/Zn and Fe/Cu were calculated obtaining values higher than unit. The samples have been prepared by incineration at temp. not higher than 450°C. The metals have been determined by AAE with air/acetilene flame. The following average concn. (in ppm) have been found: $\bar{X}_{Na} = 3.73$; $\bar{X}_{k} = 1.37$; $\bar{X}_{Ca} = 2.92$; $\bar{X}_{Mg} = 1.05$; $\bar{X}_{Zn} = 0.12$; $\bar{X}_{Cu} = 0.08$, and $X_{Fe} = 0.70$. AA

Canola oils

383 TOKARSKA (B), HAWRYSH (ZJ) and CLANDININ (MT). Study of the effect of antioxidants on storage stability of canola oil using gas liquid chromatography. **Can. Inst. Food Sci. Technol. J. 19**(3); 1986; 130-33

Olive oils

384 DIMITRIOS (B) and IOANNA (V). On the level of steryl esters in olive oil. **Food Sci.+ Technol. 19**(2); 1986; 156-7

Sterols present in the ester form in olive oil were separated from the free sterols and assayed gas chromatographically. The steroyl ester fraction obtained by combined column chromatography-thin layer chromatography was found to range from 10 mg to 35 mg/100 g oil. This conncn. is significantly lower compared to that of free sterols (approx. 150 mg/100 g) in olive oil. AA

SPICES AND CONDIMENTS

Pickles

385 BUESCHER (RW) and McGUIRE (C). Peroxidase activities in cucumber pickle products. **J. Food Sci. 51**(4); 1986; 1079-80

Peroxidase (POD) activities were determined in brines and tissues of eight retail and four food service pickle products from several commercial sources. Also, activities were examined in different locations within containers of spears. Large variation in POD activities were found between products and between sources of a given product. POD was detected in every product catgory. All sources of refrigerated dillis, fresh pack dills and spears had activity. Activities in product brimes paralleled at a lower level the activities in tissue extracts. Gradients of POD activities were obtained in jars of fresh pack spears. Spear tissues located in the centre and bottom portions of jars had the highest POD activity. AA

SENSORY EVALUATION

386 FRICKER (A). Factors influencing the taste senstivity of human beings: Age and tooth replacement. **Gordian. 86**(1&2); 1986; 8 (De)

Electrogustometric findings are briefly reported, according to which the sensitivity of taste decreases with increasing age of the test person. Artificial teeth are of influence as well. AA

387 JAMES (C). Paired-comparison and triangle sensory methods compoared for use in product improvement. **J. Food Quality.** 9(3); 1986; 175-83

Both paired comparison and triangle difference sensory techniques were found to be statistically similar in sensitivity for discrimination but not in preference between a presently marketed and a proposed new product fermentation. KAR

388 MUNOZ (AM), PANGBORN (RM) and NOBLE (AC). Sensory and mechanical attributes of gel texture. I. Effect of gelatin concentration. **J. TRecture Stud. 17**(1); 1986; 1-16

389 MUNOZ (AM), PANGBORN (RM) and NOBLE (AC). Sensory and mechanical attributes of gel texture. II. Gelatin, sodium alginate and kappa-carrageenan gels. **J. Texture Stud. 17**(1); 1986; 17-36

390 SCHIFFMAN (SS). Recent insights into the mechanisms of taste transduction and modulation. **Food Chemistry. 21**(4); 1986; 259-281

An amiloride-sensitive transport system is involved in the taste perception of sodium and lithium salts, as well as sweeteners. Taste can be modulated by purinergic compounds such as inosine monophosphate (IMP), as well as antagonists of adenosine, specifically, methyl xanthines. Kainic acid selectively reduced the taste reponses to glutamic acid which suggests that the taste of glutamate is not mediated by the identical receptor population as the so-called 'primary tastes'. AA

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

391 HODGES (RJ). The biology and control of **Prostephanus truncatus** (horn) (Coleoptera: Bostrichidae) - A destructive storage pest with an increasing range. **J. Stored Prod. Res.** 22(1); 1986; 1-14

A comprehensive review is presented on the biology and control of Prostephanus truncatus (Horn) a major pest of farm sterol maize and dried cassava. KAR

392 SIGHAMONY (S), ANEES (I), CHANDRAKALA (T) and OSMANI (Z). Efficacy of certain indigenous plant products as grain protectants against **Sitophilus oryzae** (L.) and **Rhyzopertha dominica** (F.). **J. Stored Prod. Res.** 22(1); 1986; 21-3

Oils of clove, cedarwood and karanja, at doses of 25-100 ppm, and acetone extracts of pepper provided protection to wheat against **S. oryzae** and K. **dominica** for up to 60 and 30 days of exposure, respectively. Initially, and after 15 days, all the oils gave complete mortality of **S. oryzae**. The persistence of toxicity was ranked clove, pepper, karanja and cedarwood. With **R. dominica**, both toxicity and persistence were lower and were ranked pepper, karanja, cedarwood and clove. The viability and water absorption of treated seeds was normal. AA

393 WOHLGEMUTH (G). Storage pests and their control. **Gordian.** **86**(1&2); 1986; 17-9 (De)

394 WATERFORD (CJ) and WINKS (RG). Loss rate of phosphine associated with various materials used in laboratory fumigation apparatus. **J. Stored Prod. Res. 22**(1); 1986; 25-7

Relative loss rates of phosphine associated with the use of PVC, nylon, Teflon, silicone rubber and stainless steel were determined from tubing of these materials mounted in a small glass chamber. The order of the loss rates was glass < stainless steel < Teflon < nylon < PVBC < silicone rubber. Sorption accounted for most of the loss on all materials except silicone rubber and was greatest on PVC. Permeation of phosphine through silicone rubber tubing was excessive and rendered this material unsuitable for use with atmospheres containing this gas. AA

BIOCHEMISTRY AND NUTRITION

395 FERNANDEZ (B), MAURI (LM), RESNIK (SL) and TOMIO (JM). Effect of adjusting the water to 0.95 with different solutes on the kinetics of thiamin loss in a model system. **J. Food Sci. 51**(4); 1986; 1100-101

The kinetics of thiamin degradation in a model system of pH 6.0 and water activity (a_w) 0.95 controlled with NaCl, KICl, glycerol or Na_2SO_4, was studied. The type of solute used to adjust .a_w had a dramtic influence on the rate of degradation of thiamin. The loss of vitamin increased in the following order: NaCl > KCl > glycerol > Na_2SO_4. Activation energies, however, were independent of the type of solute and ranged beween 24-28 kcal/mole. AA

396 GAUTHIER (SF), VACHON (C) and SAVOIE (L). Enzymatic conditions of an **in vitro** method to study protein digestion. **J. Food Sci. 51**(4); 1986;1 960-64

An **in vitro** digestion method was proposed for studying protein digestion. Protein (casein) was submitted to peptic proteolysis in a closed system followed by hydrolysis with pancreatic enzymes in a "digestion cell" with continuous elimination of digested products by dialysis. The peptide digestion was performed with a pepsin source of high specific activity (3152 units/mg protein) with an enzyme:substrate (E:S) ratio of 1:250. The second-step of proteolysis was carried out with pancreatin for 6 hr at an E:S ratio of 1:25. A 10 mM sodium phosphate buffer, pH 7.5, was used as the circulating dialysis buffer.

397 GINTER (E). Diet and atheroselerosis. **Ernahrungsforschung.** **31**(2); 1986; 49-52 (De)

The author has described briefly the mechanism of atherosclerosis and listed the various risk factors and protective factors that are taken in through the diet. It is possible to bring down the blood cholesterol level by 25% within a few months, by adopting a diet which includes: (i) protein: 16 energy % (40% of it being plant protein); (ii) fat: 18 energy % (one-third from polyunsaturated fattya cids); (iii) low cholesterol content (< 200 mg/8368 kJ); (iv) high proportion of dietary fibre (52 g/8368 kH); (V) pectins: 7.2 g/8368 kJ; (vi) potassium: (35 mmol/day; and (vii) vitamin A: 208 mg/day. KMD

398 KIM (H) and ZEMEL (MB). **In vitro** estimation of the potential bioavailability of calcium from sea mustard **Undaria pinnatifida**), milk, and spinach under simulated normal and reduced gastric acid conditions. **J. Food Sci. 51**(4); 1986; 957-9

399 PETZKE (KJ). Does a reduced consumption of fat increase the risk of arteriosclerosis. **Ernahrungsforschung. 31**(2); 1986; 39-40 (De)

Attempts have been made by various research groups to study the effects of replacement of fat, in the diet of experimental animals, with isoceloric amounts of carbohydrates (mainly sugars). Replacement of faty by sugars results in higher serum cholesterol levels that replacement of fat by starch. HDL_2-values also are lower when starch is used to substitute fat. However, serum cholesterol is not the only factor causing arteriosclerosis, hence a reduction in its level can have only a limited role in the prevention of heart and circulatory diseases. KMD

400 PETZKE (KJ). Recent results relating to the physiological significance of tocopherols. **Ernahrungsforschung. 31**(2); 1986; 48-49 (De)

Some recent findings relating to the biochemical and physiological action of tocopherols have been summarized by the author. They relate to the ability of tocopherols to (i) form complexes with saturated and unsaturated fattyacids, and thus act as a protectivbe factor against ischaemic diseaes; (ii) remove free radicals of amino acids like tryptophane, tyrosine, methionine or histidine which appear to be responsible for the aging process and degenerative diseases; and (iii) act as a detoxifying agent, and especially to reduce the level of lipoperoxides in human serum. KMD

401 WEINER (R). Intestinal gases and diet. **Ernahrungsforschung. 31**(2); 1986; 55-57 (De)

Existing knowledge relating to the problem of flatulence has been discussed under the following headings: (1) physico-chemical composition of intestinal gases; (2) principles of formation of intestinal gas; (3) bacterial-fermentative gas formation; (4) liberation of carbon dioxide; (5) vegetarian diet and formation of intestinal gas; (6) volume of intestinal gas; (7) influence formation of intestinal gas by means of medicaments; and (8) differential diagnosis: meteorismandincreased flatulence. As there are still many gaps in our knowledge about flatulence, more intensive research on this topic is desirable. KMD

TISSUE CULTURE

Nil

TOXICOLOGY AND HYGIENE

402 ANDERSON (ME), HUFF (HE), MARSHALL (RT) and NAUMANN (HD). A simple qualitative method for detecting cleanliness of food contact surface. **J. Food Prot. 49**(5); 1986; 342-6

Two tests were developed for detecting protein on food contact surfaces. Wetted swabs rubbed over surfaces on which 3 µg of protein was dried became visibly blue when reacted with Folin's test ragents. Wetted Chemstrips, available to test for protein in urine, became visibly coloured on rubbing on surfaces with 0.25 µg of protein. Sensitivity of the tests varied with type of protein. AA

403 MARSHALL (DL) and BULLERMAN (LB). Effect of sucrose esters in combination with selected mold inhibitors on growth and aflatoxin production by **Aspergillus parasiticus**. **J. Food Prot. 49**(5); 1986; 378-82, 388

404 TODD (ECD), SZABO (R) and SPIRING (F). Donairs (Gyros) - Potential hazards and control. **J. Food Prot. 49**(5); 1986; 369-77

405 WAGNER (MK) and BUSTA (FF). Association of (32p) with **Clostridium botulinum** 52A vegetative cells following growth in a medium containing soidum dihydrogen (32p) pyrophosphate. **J. Food Prot. 49**(5); 1986; 352-4

The association of (32_{p}) with **Clostridium botuylinum** 52A vegetative cells following growth in a medium containing either sodium dihydrogen (32_{p})-pyrophosphyuate ((32_{p})-SAPP) or sodium dihydrogen (32_{p}) -orthophosphate (32_{p})-orthophosphate) was studied. Absorbency measuremnts at 630 nm were used in addition to (32_{p}) recovery in determining (32_{p}) association with cellular grwoth and metabolism. Radiolabeling experiments showed (32_{p})-orthophosphate was associated withvegetative cells during logarithmic grrowth, yet was released once stationary phase was attained or upon lysis. (32_{p})-SAPP was also associated with cells during growth, but was not released once stationary phase and attained. Results suggested (32_{p})-SAPP continued to bind cells or other metabolic materials following attainment of the stationary phase of cells. Fractionation of 24 and 48 hr-old cultures grown in the presence of (32_{p})-SAPP showed a higher percentage of (32_{p}) associated with the RNA fraction (3.91 and 2.48%, respectively) compared to the DNA fraction (0.09 and 0.07%, respectively). AA

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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm,cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
$^{\circ}$F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal,kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg,ml,mm)
m-equiv	milli-equivalent
$\mathcal{M}$	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-(10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
$\mathcal{P}$	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
μ	micro-(as in μg, μm)
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

GENERAL

406 Anon. Economic situation of the soup industry. **Gordian.** 86(6); 1986; 119 (De)

407 PR. Chitosan for the food industry. **Gordian.** 86(3); 1986; 39 (De)

FOOD PROCESSING AND PACKAGING

408 BERSET (C) and MARTY (C). Potential use of annatto in extrusion-cooking. **Food Sci. + Technol.** 19(2); 1986; 126-31 (Fr)

High thermal treatments in different experimental conditions revealed the good stability of the annatto pigments. The high resistance of the dye in extrusion cooking assays seems to be very promising for industrial applications in the expanded food field. Nevertheless some modifications in the absorption spectrum of bixin appeared, but they did not induce sensible changes of the products colour. Tristimulus colorimetry is a suitable and easy method to follow up the extrudates fading during storage. AA

409 COVO (M) and VERGNET (P). Food irradiation seen as wave of future. **Ind. Aliment.** 25(2); 1986; 128-33 (It)

FOOD ENGINEERING AND EQUIPMENT

410 MARTIN (A), JIMENEZ (L) and IGLESIAS (JL). Kinetic study of the freeze-drying of a type of "gazpacho". II. Desorption. **Rev. Agroquim. Technol. Aliment.** 26(2); 1986; 297-303 (Es)

A semi-empirical model was fashioned in an attempt to correlate the drying rate and operation variables during the water-desorption stage in the freeze-drying of "gazpacho" - a tasty mix made of tomato (65%), egg (21%), olive oil (9.4%), vinegar (2.2%), salt (1.6%), and garlic (0.8%) in which bread crumbs are cooked. An equation for the drying rate was first derived. Thereafter, a differential balance of energy was deduced, which, when integrated simultaneously with the previous equation reproduces the evolution of the temp. and the moisture in the product, with relative errors of 10 and 5% resp. KMD

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

411 ARKAD (O), ARKAD (T) and GARTI (N). Quantitative determination of creaming in O/W emulsions by use of absorption measurements of oil soluble dyes. **Food Sci. + Technol.** 19(2); 1986; 164-6

412 HERBEL (W) and MONTAG (A). Determination of purine and pyrimidine bases, bound in compounds of low-molecular weight after isolation by gel permeation-chromatography and hydrolytic digestion under pressure. **Z. Lebensmittel-Unters Forsch. 183**(1); 1986; 12-7 (De)

Compounds with purine and pyrimidine bases of low-mol. wt. were separated and isolated by gel permeation-chromatography. After acid hydrolysis of nucleotides to free bases in a pressure digestion vessel the bases were separated on cation exchange resins. The data obtained are also reported in relation to the total base content of the substrate. It could be demonstrated that in untreated samples the portion of combined bases of low-mol. wt. results in 5 to 15% of the corresponding total base content, depending on base and kind of food. In fresh unheated food samples adenine nucleotides are converted rapidly to inosine nucleotides and hypoxanthine; therefore only a small share of adenine is found from compounds of low-mol. wt. In heated food the portion of combined low-mol. wt. purine and pyrimidine bases proves to be much higher, due to partial hydrolysis of nucleic acids. It amounts to 30 to 50% of the total base content, depending on base and kind of food. AA

413 TOMAS-LORENTE (F) and TOMAS-BARBERAN (FA). Mass spectrometry of the aglycones of flavones, 3-methoxy-flavones, and flavonols. II. Ions produced by retro-Diels-Alder fragmentation. **Rev. Agroquim. Technol. Aliment. 26**(2); 1986; 203-12 (Es)

The authors have reviewed the application of electron impact mass spectrometry for determination of the structures of flavone, flavonol, and 3-methoxy-flavone aglycones. Fragmentation patterns have been discussed, and some relationships established between the occurrence of certain fragments and the molecular structure of the compound under test. KMD

FOOD LAWS AND REGULATIONS

Nil

FOOD MICROBIOLOGY

414 GERHARDT (U). The use of industrially produced enzymes in the production of foods. **Gordian. 86**(3); 1986; 34-5 (De)

The author has mentioned some of the uses to which cell separating (pectic) enzymes and cellulases may be put in the mechanical pretreatment of plant material, and in the fruit and vegetable, protein, starch, and edible oil industries. KMD

415 KENNEDY (JE) Jr., WEI (CI) and OBLINGER (JL). Methodology for enumeration of coliphages in foods. **Appl. Environ. Microbiol. 51**(5); 1986; 956-62

Broadly applicable procedures for efficient recovery of coliphages from various types of foods were developed and evaluated. The effects of eluent composition, eluent and sample suspension, pH, and chaotropic agents on the recovery of T2, MS2 and indigenous coliphages from various foods were investigated. The methods of sample suspension and clarification were also evaluated for recovery efficiency and ease of use. MVG

Fermentation

416 BROOKS (CH) and RUSSELL (PD). A unified design approach to fermentor sterility and containment. **Process Biochem.** 21(3); 1986; 77-80

Reviews categorisation of fermentation processes; different levels of sterility and containment for current and foreseeable fermentation processes and legislative requirements for these processes; design methods contributing to sterility and containment; unified approach to solve both containment and contamination problems and some advantages of unified approach. BV

Cryptococcus albidus

417 HANSSON (L) and DOSTALEK (M). Influence of cultivation conditions on lipid production by **Cryptococcus albidus. Appl. Microbiol. Biotechnol.** 24(1); 1986; 12-8

In nitrogen limited batch cultures, a liquid content of 34% (w/w) in biomass and a max. specific lipid productivity of 37 mg lipid/g lipid free biomass-h, was determined. The yield of lipid from glucose was about 0.15 g/g in nitrogen limited and 0.11 g/g in excess nitrogen cultures. In a nitrogen limited fed-batch culture, 12.4 g/l lipid was produced at 90 h of cultivation and the cells contained 46.3% (w/w) lipid. KAR

Lactobacillus

418 SCHAFFNER (DW) and BEUCHAT (LR). Fermentation of aqueous plant seed extracts by lactic acid bacteria. **Appl. Environ. Microbiol.** 51(5); 1986; 1072-6

The effects of lactic acid bacterial fermentation on chemical and physical changes in aqueous extracts of cowpea (**Vigna unguiculata**), peanut (**Arachis hypogea**), soybean (**Glycine max**) and sorghum (**Sorghum vulgare**) were studied. Seed extracts were inoculated separately by **lactobacillus helveticus, L. delbrneckii, L. casei, L. bulgaricus, L. acidophilus** and **Streptococcus thermophilus.** The last two named were also evaluated as inocula for fermenting the legume extracts. Bacterial population and changes in titratable acidity, pH, viscosity, and colour were measured over a 72 h period at 37°C during fermentation. Max. bacterial population, titratable acidity, pH and viscosity vaired with the type of extract and bacterial strain. The max. population of each population was influenced by fermentable carbohydrates which in turn influenced acid production and change in pH. Amount of protein and titratable acidity influenced viscosity change, pasteurisation, fermentation and source of extract affected colour. In all extracts inoculated simultaneously with **L. bulgaricus** and **S. thermophilus**, a sinergistic affect resulted in increased bacterial population, titratable acidity and viscosity and decreased pH in all extracts as compared to extracts fermented with either of these organisms individually. Fermented extracts were shown as potential substitutes for cultured dairy products. MVG

419 ZEE (JA), BOUCHARD (C), SIMARD (RE), PICHARD (B) and HOLLEY (RA). Effect of pH, temperature and salts on growth of **Lactobacillus plantarum** under modified atmospheres. **Food Sci. + Technol.** 19(2); 1986; 132-7

Lactobacillus plantarum was subjected to different growth conditions (temp. pH, salts, gas mixtures). Growth did not occur at 0, 3, 7 and 10°C, but increased with increasing temp. Bacteria grew well under CO_2 as compared to other gases. Growth was best at pH 6, low at 5 and 7, and was inhibited at pH 4. The addition of Mg^{++} did not affect the rate of growth of **L. plantarum**; however, Fe^{++} had an inhibitory effect on bacterial growth under several gas atmospheres. AA

Saccharomycopsis fibuliger

420 DOSTALEK (M). Production of lipid from starch by a nitrogen-controlled mixed culture of **Saccharomycopsis fibuliger** and **Rhodosporidium toruloides**. **Appl. Microbiol. Biotechnol. 24**(1); 1986; 19-23

Saccharomycopsis fibuliger was used as the amylolytic microorganism and **Rhodosporidium toruloides** which does not grow on starch, as the lipid producer. The highest lipid concn. (9.7 g/l), highest overall lipid production rate (0.15 g/l/hr) and highest concn. of lipid biomass (36.5%) were obtained in cultures with an initial N concn. of 0.5 g/l. KAR

Mushrooms

421 RAJARATHNAM (S), BANO (Z) and PATWARDHAN (MV). Nutrition of the mushroom **Pleurotus flabellatus** during its growth on paddy straw substrate. **J. Hortic. Sci. 61**(2); 1986; 223-32

Neither acid swelling or alkali delignification of the straw nor addition of extra carbon as glucose or cellulose to the straw substrate during fructification increased the yield. N supplementation in organic form increased the yields and the protein contents of the fruit bodies significantly only after spawn run. Supplementation of the spent straw substrate with cottonseed powder, wheat bran and casein resulted in higher yields and raised the protein content of the fruit bodies. Of several mineral salts tried as supplements, only ferrous sulphate augumented yield significantly when added to the straw after sprawn run. KAR

Truffles

422 SENESI (E), MAESTRELLI (A) and TESTONI (A). Some aspects of the technological transformation of white truffles (**Tuber magnatum** Pico). **Ind. Aliment. 25**(237); 1986; 269-9 (It)

The results of some experiments on the long and short term storage of white truffles are referred. The truffles, wrapped in a shrinkable package and stored in a cold room (0 C) for 28 days, showed a very small wt loss with respect to the unwrapped ones (2.4 and 16.3% resp.). Freezing confirmed its suitability for the maintenance of good organoleptic characters of white truffles during a 12 months storage at -20 C. The enzymatic liquefaction, followed by vacuum drying, allowed the production of a strongly flavoured and easily soluble white truffle powder. AA

FOOD ADDITIVES

423 KUHNERT (P). ADI values for additives. **Gordian. 86**(3); 1986; 40-45 (De)

ADI values expressed in mg/kg/day have been reported for more 225 permitted food additives, and for 37 other compounds that are not officially permitted as food additives at present. KMD

Antioxidants

424 FARR (DR), LOLIGER (J) and SAVOY (M-C). Foods protected by the important biological antioxidant: Uric acid. **J. Sci. Food Agric. 37**(8); 1986; 804-10

Uric acid has been proposed as an antioxidant in biological fluids especially in humans. It is shown that uric acid can be used effectively to protect food and model food preparations against oxidation. Precooked cereal flakes and food emulsions were stabilised with varying levels of uric acid. AA

Turmeric

425 BHAVANISHANKAR (TN), NARASIMHA MURTHY (K) and SREENIVASA MURTHY (V). Toxicity studies on turmeric (**Curcuma longa** L.) - Long termtoxicity studies in albino rats and monkeys. **J. Food Sci. Technol. (India)** **23**(5); 1986; 287-90

Turmeric (500 mg/kg body wt.) and its alcoholic extract (60 mg/kg body wt.) were fed to albino rats and monkeys for 12 and 9 months resp., and the effect on growth, food utilization, haemotological and organ wt. (liver, kidney, heart, brain and spleen) were assessed. Growth response and food intake did not show any change in rats and monkeys fed turmeric or alcoholic extract of turmeric for the entire period of experiment. Organ wt., blood constituents and urine analysis of rats and monkeys also did not show any deviation from those of the controls. KAR

426 WALTER (RH) and SHERMAN (RM). Rheology of high-methoxyl pectin jelly sols prepared above and below the gelation temperature. **Food Sci. + Technol.** 19(2); 1986; 95-100

A gelation temp. range was identified in the locus of most cooling pectin jelly sols. The sols, prepared at the boiling temp., were thermosetting. Their activation energy of viscous flow (E), measured between 60 C and 80 C, was comparatively larger than that when the jellies were prepared by heating below the gelation temp. and measured between 45 C and 70 C. The smaller E of the latter preparations indicated a relative absence of a restrictive gel structure. The low-temp. gels tended to be thermoplastic, hysteretic and metastable. The gelation temp. seemed to be the upper limit below which heating should be confined, in order to maintain flow reversibility in a heated mixture of jelly ingredients. AA

CEREALS

427 FELDHEIM (W). Cereal fibre in the diet. **Gordian.** **86**(3); 1986; 36-9 (De)

Though our present knowledge about dietary fibre is far from complete, we know enough at present to suggest an increase of dietary fibre intake from 17-20 g/day to 30-35 g/day, in W. Germany. At least half of the dietary fibre must come from cereal products (bread, baked goods, and paste goods). The German Nutrition Society has recently supported this recommendation. KMD

428 FORNAL (L), SMIETANA (Z), SORAL-SMIETANA (M) and SZPENDOWSKI (J). Changes of the chemical and physico-chemical properties of starch during extrusion of cereal flours and their mixtures with milk proteins. **Getreide Mehl Brot.** 40(5); 1986; 154-9 (German)

The temp. and moisture content during extrusion have a negative influence on the expansion index and density of the extrudates, the greatest influence being that of temp. At optimal values of these extrusion parameters, the greatest expansion is obtained with buckwheat or maize flours, and the least expansion with barley and wheat flours. Addition of milk proteins to the flour increases the N, bound lipids and ash contents of the extruded products. Extrusion results in an increase in the solubility of starch, and a decrease in its expansion capacity. The expansion of extruded products is found to be dependent on starch quality also. Extrusion produces changes in the chemical structure of the isolated starches. Addition of milk proteins does not alter the solubility or expansion capacity of the starches.

KMD

429 GRANEL (G). Description and definitions of cereal foods. **Getreide Mehl. Brot. 40**(5); 1986; 131-3 (German)

The term "cereal foods" covers a very wide range of products. Some of these products have been defined in the customs duty regulations of the European Community and other guidelines. The consumption of "cereals" and flakes is increasing steadily; but it should be noted that there are great differences in the nutritive value of currently marketed products. KMD

Paddy

430 JAIN (RK), BHOLE (NG) and SIRIPURAPU (SCB). Optimization of operating parameters of a centrifugal sheller for dehusking Jaya variety paddy. **J. Food Sci. Technol. (India)** 23(5); 1986; 252-6

Raw and parboiled paddy of Jaya var. with 13.5-14.5% moisture content was milled in a centrifugal sheller by varying the feed rate between 150 and 270 kg/h and with a impeller speed ranging from 2250 to 3300 rev/min. The shelling efficiency increased at a decreasing rate with the increase in the impeller speed for raw and parboiled paddy. For raw and parboiled paddy shelling efficiency decreased with the increase in feed rate at all impeller speeds. Optimum rice out turn was obtained from sheller at an impeller speed of 2700 rev/min for raw paddy at 13.5% moisture content (wet basis) and 2650 rev/min for parboiled paddy at 14.25% moisture content (wet basis) at an optimum feed rate of 240 kg/h. KAR

Rice

431 CORDERO (V), BENDEDITO de BARBER (C), CLEMENTE (G) and PRIMO (E). Rice bran enzyme inactivation. Relationships between the parameters of the process and lipase activity. **Rev. Agroquim. Tecnol. Aliment. 26**(2); 1986; 276-82 (Es)

Influence of time, temp., moisture content and initial enzymatic activity as well as their interactions on heat inactivation of rice bran lipase has been determined following a factorial design. Residual lipase activity decreases sharply during the first minutes of treatment and slightly afterwards. High temp. and moisture content together with short time treatments are more efficient. Lipase is irreversibly inactivated at 100 C and 18% moisture content, in less than one minute. AA

432 VAINGANKAR (NM) and KULKARNI (PR). Preliminary observations on cooking quality parameters as indicators of adulteration of Basmati rice. **J. Sci. Food Agric.** 37(7); 1986; 707-8

Differential length-breadth ratio and loss of solids in cooking water have been found to be reliable indicators of adulteration of Basmati rice with Saket-4 rice, which is one of the rice varieties used frequently for adulteration. AA

Triticales

433 LORENZ (K) and ROSS (M). Baking properties of NZ grown triticales. **Food Technol. NZ.** 21(5); 1986; 35-9, 88

The triticales performed poorly in bread baking tests and could be used only as partial replacement of the wheat flour. KAR

Wheat

434 ALOK SHAH, CHAUHAN (GS) and VERMA (NS). Effect of enzyme active soy flour and roasted soy flour on rheological and baking characteristics

of wheat flour. **J. Food Sci. Technol. (India) 23**(5); 1986; 257-60

Wheat-soy flour blends in the ratio of 100:0, 97:3, 94:6, 91:9, 88:12, 85:15, and 82:18 were prepared using (i) enzyme active soy flour, and (ii) sand roasted (200 ± 4 C) soy flour. The addition of (i) or (ii) increased the mixing tolerance, mixing time, dough stability, elasticity and deformation work and decreased developing area, extensibility and baking strength. However, the effects were more pronounced with (i) than with (ii). Loaf vol. loaf height, texture, crumb colour and grain, crust colour and flavour of bread were less affected with (ii) than with (i). Organoleptic studies revealed that the addition of (ii) upto 12% gave a satisfactory bread which was almost equal to that produced by 9% incorporation of (i).It is concluded that (ii) can be used in place of (i) for fortification of wheat flour in bread making. KAR

435 DIRNDORFER (M), KIEFFER (R) and BELITZ (HD). Changes in the gluten of different wheat varieties due to oxidation. **Z. Lebensmittel-Unters Forsch. 183**(1); 1986; 33-8 (De)

The results show that the known changes during aging of flours and the different behaviour of flours towards oxidizing agents are related to reactions of specific protein components of the gluten, which are typical for hard varieties. These reactions are obviously not dependent on low mol. wt. components of the flour.AA

436 VENKATESWARA RAO (G), SHURPALEKAR (SR) and NIERLE (W). Effect of wheat flour extraction rate on protein fractions. **Food Sci. + Technol. 19**(2); 1986; 184-6

Proteins were fractionated in flours of different extraction rates (70, 75, 80 and 85%) milled from the wheats WG 357, WL 711 and Pissi (India), Jubilar (West Germany) and HRS (USA). As flour extraction rate increased, the albumin, globulin and residue protein fractions of flour samples and total flour proteins increased, but the increase in globulins was comparatively higher. Gliadin content decreased with increased extraction rate, except for Pissi wheat, where an increase was observed. Glutenin increased from 70 to 75 or 80% extraction flours, but decreased at 85% extraction. Also, as extraction rate increased, the ratio of albumins and globulins to gliadins, glutenins and residue protein increased, while gliadin to glutenin ratio was not affected. AA

437 WINDEMANN (H), MEIER (P) and BAUMGARTNER (E). Detection of wheat gliadins in heated foods by reversed-phase high-performance liquid chromatography. **Z. Lebensmittel-Unters Forsch. 183**(1); 1986; 26-32 (De)

To recognise and determine the wheat gliadins in unheated gluten-free food for coeliac patients the immunological methods such as ELISA can be used. In heated food (above 80-90 C) these methods fail wholly or in part to achieve the quantitative determination of wheat gliadin. The changes in protein patterns after heat treatment are also revealed by the RP-HPLC of wheat gliadins and some peaks appear,which are characteristic for heat treatment wheat flour. Using these peaks, about 2% admixture of wheat flour (T. **aestivum**, T. **durum**) as well as of rye flour can be detected. In foods which contain more than 50% skim milk the addition of only at least 5% of these flours can bedetected. The ethanolic extracts of foods were conc by freeze-drying prior to analysis by HPLC. The ethanol-soluble non-dialysable food components affect the quantitative determination of wheat or rye proteins by means of peak areas. Selective enrichment is a possibility. The RP-HPLC-analysis of ethanol-soluble proteins makes it possible to detect heated flours of wheat and rye (cooked, roller-dryed, extrusion-cooked) in gluten free food. AA

MILLETS

Ragi

438 **SHUKLA (SS), GUPTA (OP), SWARKAR (NJ), TOMAR (AK) and SHARMA (YK).** Malting quality of ragi varieties - nutrient and mineral composition of their malts. **Indian J. Nutr. Diet.** 23(8); 1986; 223-7

Malting quality, nutrient and mineral composition of ragi malt prepared from 4 brown var. (JNR 852, PR 202, JNR 1008 and JNR 981) and 4 white var. (WR 13, CO9, WR 4 and WR 5) of ragi were tested. The germination % ranged from 77.7 to 93.0% and the amylase activity varied from 156.8 to 300.1 units. The protein content of the malt ranged from 4.6 to 5.7%; the carbohydrate and the soluble sugar contents were 73.7 to 83.1% and 2.9 to 9.9 mg/100g. resp. The ether extractive values of the malt flour ranged from 1.1 to 2.2%. The ragi malt contained (mg/100 g) 33.7 to 474.1 of S, 304.0 to 349.6 of P., 88.5 to 137.0 of S and 131.6 to 233.4 of Mg resp. Other minerals tested include Na, K, Fe, Zn, Cu, Mn along with phytic acid. Based on the malting quality var. WR 13, JNR 1008 and JNR 852 were considered best for preparing ragi malt as their germination, percentage ranged from 85.3 to 93.0% and amylase activity from 208.8 to 300.1. UES

PULSES

Broad beans

439 **NAJI (EZ), JADDOU (H) and SIDDIQI (AM).** Effect of gamma irradiation on cooking time and physico-chemical characteristics of broad beans (**Vicia faba**) starch. **J. Food sci. Technol. (India)** 23(5); 1986; 291-3

The cooking time of broad beans (**Vicia faba**) was reduced by 27, 46, 58 and 63% when the beans were gamma irradiated with 1.25, 2.50, 5.00 and 10.00 kGy resp. Irradiation upto .5 kGy did not show any change in flavour and quality of broad beans as judged by sensory evaluation. Rheological properties were adversely affected by irradiation, the max. viscosity of 880 B.U. for the control group got reduced to 530 B.U. after irradiation with 5 kGy. Solubility of starch from irradiated broad bean increased with concomitant decrease in swelling power. It is concluded that irradiation improves the textural quality of broad beans. KAR

French beans

440 **KERMASHA (S), VOORT (FR) and METCHE (M).** Lipase activity and fatty acid composition in stored full-fat French bean flour. **Can. Inst. Food Sci. Technol. J.** 19(3); 1986; 92-4

The production of free fatty acids due to lipase action in full-fat French bean flour may be closely related to the autoxidation of the lipid present, which has ramifications in terms of organoleptic quality. Lipase activity was determined in the succulent green bean, freshly prepared mature bean flour and flour stored for two years at 4° C and was found to be 21, 42 and 125 x 10^{-6} µmeq acid/mg protein/min. resp. The fatty acid profile of the mature bean flour was measured following storage at -18, 4, 20 and 35°C. The fatty acid profile of the bean flour did not change significantly in samples stored at -18 and 4° C, however obvious changes took place in the samples stored at 20 and 35°C with a loss of long chain the appearance of shorter chain fatty acids. The results indicated that lipase was active in the flour, increasing in activity with storage and that temp. above 4° C accelerated the process of lipolysis in full fat flour significantly, even at low moisture levels. The action of lipase could therefore be a significant factor in the development of off flavours and odours by contributing free fatty acids which in turn are more readily oxidized. AA

Lentils

441 BATRA (VIP), VASISHTA (R) and DHINDSA (KS). Effect of heat and germination on trypsin inhibitor activity in lentil and pigeon pea. **J. Food Sci. Technol. (India)** 23(5); 1986; 260-63

Seeds of 7 strains of lentil (**Lens culinaris**) (L-9-12, LH-82-3, LH-82-4, LH-82-6, LH-82-7, LH-21 and LH-311) and 6 strains of pigeon pea (**Cajanus cajan**) (H-77216, UPAS-120, Prabhat, T-21, H-77208 and H-7244) were subjected to (i) dry heating comprising of heating in hot air oven at 121 C for 10 and 20 min (pigeon pea) and 1 and 2 h (lentil), (ii) autoclaving the flour for 10 and 20 min at 121 C, (iii) boiling for 10 and 20 min, (iv) presoaking for 24 h, and (v) germination at 28 C for 6 days. The trypsin inhibitor activity (TIA) in untreated flour varied between 638 and 695 units in lentil and between 547 and 852 units in pigeon pea. By dry heating of lentil in the first h, 73-87% and in the second h, 6-14% TIA was lost and in pigeon pea flour substantial decline in TIA was observed in 20 min dry heating. Autoclaving for 20 min destroyed the TIA completely in lentil and 88-100% TIA in pigeon pea. Boiling water treatment for 10 min destroyed TIA completely in lentil irrespective of strain and similar treatment for pigeon pea destroyed the activity to very low levels. Presoaking of lentil decreased TIA by 58-66% and further germination for 3 days slightly decreased the TIA but 6-day germination substantially lowered the TIA (21-54%). In pigeon pea soaking reduced the TIA by 1-14%; germination for 3 days increased TIA, but at 6-day germination decreased TIA to a greater extent. TI in lentil was more susceptible to all the treatments except dry heating, which was more effective for pigeon pea. Var. did not show much difference when subjected to various treatments except in H-77216 (pigeon pea) which showed a max. loss of TIA of 40%. KAR

Peas

442 MASSON (P), TOME (D) and GABORIT (T). Large-scale preparation and characterization of pea seed lectins (**Pisum sativum** L.). **Food Sci. + Technol.** 19(2); 1986; 138-43

Lectins from various pea seed cv., a winter crop (FRIMAS) and two summer crops (FINALE and AMINO), isolated by affinity chromatography, show similar biochemical characteristics. Large amounts of material of similar purity and characteristics have also been obtained by a large-scale procedure. Three isolectins, with similar mol. wt. and subunits composition, are separated by chromatofocusing from the active fraction. These lectins, devoid of sulphur containing amino acids, consist of two major subunits, a heavy chain β(18,000) and a light chain α(10,500), linked by noncovalent bonds mainly in a dimeric form α,β as observed by gel filtration. AA

443 MONERRI (C) and GUARDIOLA (JL). The amylases from pea seedlings. Their independent determination determination in crude protein extracts. **Rev. Agroquim. Tecnol. Aliment.** 26(2); 1986; 219-33 (Es)

OILSEEDS AND NUTS

Soybeans

444 BIJOLA (BD), GUPTA (MS), AGRAWAL (US), SHIVHARE (US) and SINGH (BPN). Impact damage characteristics of soybean. **J. Food Sci. Technol. (India). 23**(5); 1986; 249-51

Soybean of moisture content 7.24, 11.60 and 15.10% were dropped on mild steel, cast iron and wood surfaces separately from a height ranging from 0.25 to 5.00 m and the impact characteristics were studied for single and two drops. It is concluded that the damage to grain increases linearly with the drop height, damage increases linearly with the drop height, % damage increases with the number of impacts but decreases with increase in grain moisture content, and max. damage was when the impact was on mild steel surface than with wood or cast iron. KAR'

445 HENRY CHIN (K-O) and KOEHLER (PE). Effect of salt concentration and incubation temperature on formation of histamine, phenethylamine, tryptamine and tyramine during miso fermentation. **J. Food Prot. 49**(6); 1986; 423-7

446 IRELAND (PA), DZIEDZIC (SZ) and KEARSLEY (MW). Saponin content of soy and some commercial soy products by means of high-performance liquid chromatography of the sapogenins. **J. Sci. Food Agric.** 37(7); 1986; 694-8

The level of saponin in whole soybeans was 0.47%, in soy flours 0.43-0.67%; protein isolate, 0.76%, soy milk 0.022-0.026% but not detected in soy protein conc. KAR

447 MOLNAR-PERL (I) and PINTER-SZAKACS (M). Monitoring of Maillard reactions in soy products. **Z. Lebensmittel-Unters Forsch. 183**(1); 1986; 18-25 (De)

Chemical mechanism and the analytical methods suggested in the literature for the analysis of early Maillard reactions are summarised and critically evaluated. The applicability of our method for the measurement of the Maillard reactions - the soluble raffinose oligosaccharides and the basic amino groups of proteins - are illustrated by following early Maillard reactions in differently denaturated soybean samples. The quantitative relations of Maillard reactions taking place in natural matrices could be clarified by monitoring both of the reactants by means of methods not requiring correction factors. AA

448 PALLAVICINI (C) and TRENTIN (G). Preparation and analysis of coprecipitates obtained from soy protein and milk whey mixtures treated with proteases. Preliminary note. **Ind. Aliment. 25**(2); 1986; 113-8 (It)

With the use of some proteases a copreciate was obtained from mixtures of soy protein, as isolate, and milk whey. Preliminary analysis indicated that it includes almost all the corresponding to the soy isolate and about 60% of the serum protein. Among the enzymes tested, papain and alcalase showed the highest capacity in coprecipitating the partially hydrolyzed material of the blends and, between the latter, papain resulted more productive. For both enzymes the optimum conditions (temp. pH, incubation, time, etc.) of coprecipitate formation were determined. AA

Chufa

449 MORENO (JA), GASQUE (F), LAFUENTE (B) and SCHWARTZ (M). Maltodextrin as a coadjuvant for spray-drying of orgeat of "chufas" (**Cyperus esculentus, L.). Rev. Agroquim. Tecnol. Aliment.** 26(2); 1986; 263-8 (Es)

The use of maltodextrin (MD) to improve aroma retention during spray-drying of this beverage was studied. It was observed that when 30% of MD was added, volatiles retention was doubled (38%), catalase was inactivcated and, although browning increased, it was not visually detectable due to the masking effect of MD. AA

TUBERS AND VEGETABLES

450 GOTZ-SCHMIDT (EM), WENZEL (M) and SCHREIER (P). C_6-volatiles in homogenates from green leaves: Localization of hydroperoxide lyase activity. **Food Sci. + Technol.** 19(2); 1986; 152-5

A screening of the formation of C_6-volatiles in homogenized leaves from vine, tobacco, spinach, chicory, leek, lettuce, endive, cabbage, savoy, feeding turnip, kohlrabi and radish was carried out. With conc. > 50 mg/kg (fresh wt.) leaf homogenates from vine, tobacco, kohlrabi, radish and endive were shown to be very active in C_6-aldehyde formation. Among the last-mentioned tissues the formation of C_6-volatiles from endive was studied in more detail. It was demonstrated that hydroperoxide lyase is bound, probably as an extrinsic enzyme, to the thylakoid membrane of chloroplasts. AA

Cassava

451 AKINRELE (IA). Hydrocyanic acid hazard during large scale cassava processing. **Trop. Sci.** 26(1); 1986; 59-65

Current efforts to modernize and increase the output of cassava products through mechanized processing could pose toxic hazards to process workers. An attempt has been made to investigate and assess the potential of this hazard on the basis of existing operational activities. The most potent unit operation areas are those of peeling and grating of fresh cassava roots. It is recommended that a cassava processing factory should be designed to allow for ventilation of 25.5 m^3 of air per 1 kg of processed roots. AA

Potatoes

452 HELLENAS (K-E). A simplified procedure for quantification of potato glycoalkaloids in tuber extracts by h.p.l.c.; comparison with ELISA and a colorimetric method. **J. Sci. Food Agric.** 37(8); 1986; 776-82

An improved high-performance liquid chromatography (HPLC) procedure for determination of glycoalkaloid levels in potato tubers has been developed in which Sep-Pak cartridges replace the commonly used alkaline precipitation for clean-up of tuber extracts. Glycoalkaloids are extracted from fresh tuber tissue into an aqueous medium, the extract is submitted to clean-up and α-solanine and α-chaconine are quantitatively separated on a reversed phase column with ethanolamine modifier added to the mobile phase. Potato tubers were comparatively analysed for their glycoalkaloid content by this and two other methods: a recently developed immunoassay (ELISA) and a colorimetric procedure representing the traditional chemical approach. Agreement between the HPLC and the other methods was good. AA

453 KAHLON (SS) and MANINDER ARORA. Utilization of potato peels by fungi for protein production. **J. Food Sci. Technol. (India)** 23(5); 1986; 264-7

The ten fungi tested for protein production by solid state fermentation from potato peel yielded 11.6-14.6% crude protein and 8.1 to 12.0% true protein. **Pleurotus ostreatus** produced max. crude protein (11.2-21.0%) and true protein (7.5-11.6%). Hence the production was tried at varying condition of incubation temp. (0.40° C) incubation period (0.21 days), different N sources (ammonium chloride, urea, ammonium sulphate, calcium nitrate and potassium nitrate), and pH (3.0-7.0). Under optimum conditions of temp. (30°C), incubation period (17 days), pH (5.5), and with ammonium chloride (0.04% N) gave a product with 21.0% crude protein or 14.6% true protein and 8.5% crude fibre. KAR

454 ROUCHAUD (J), MOONS (C), DETROUX (L), HAQUENNE (W), SEUTIN (E), NYS (L) and MEYER (JA). Quality of potatoes treated with selected insecticides and potato-haulm killers. **J. Hortic. Sci. 61**(2); 1986; 239-42

Treatment with aldicarb and demeton-S-methyl had no influence on the dry wt. or on the starch or protein contents, but increased the content of ascorbic acid by up to 25%. Diquat, dinoseb and metoxuron had no effect on dry wt or starch content; dinoseb and metoxuron increased the protein and ascorbic acid contents by up to 20%. The effects of the pesticide treatments on the chemical composition of freshly harvested potatoes were maintained during their cold storage. AA

Amaranth

455 PANT (KC). The effect of amino acid or protein supplementation on the nutritional quality of grain amaranth. **J. Food sci. Technol. (India) 23**(5); 1986; 298-300

Amaranth (**Amaranthus hypochondriacus**) grain raw, popped and popped with 0.2% L-leucine (reportedly the most limiting amino acid) or 0.2% L-threonine, or 2% skimmed milk protein was fed to weanling rats. Addition of leucine or threonine did not show any supplementary effect on net protein ratio (NPR) or relative NPR. The skimmed milk protein supplementation increased the relative NPR from 66 to 78%. The NPR and relative NPR of raw amaranth was 4.225 and 69 resp. compared to 4.004 and 66 for popped amaranth resp. KAR

Bell peppers

456 MILLER (WR), RISSE (LA) and McDONALD (RE). Deterioration of individually wrapped and non-wrapped bell peppers during long-term storage. **Trop. Sci. 26**(1); 1986; 1-8

Rates of change for wt. loss, firmness, colour and decay were predicted by regression techniques for bell peppers, both wrapped in plastic film and non-wrapped, during 4 wk of storage at 7.0 or 15.5°C. The rates of wt. loss were 0.06% for wrapped and 0.74% for non-wrapped peppers per wk. stored at 7.0°C and were 0.12 and 1.29% per wk. resp. for pods stored at 15.5 C. Wrapping significantly reduced the rate of pod softening during storage at both temp. Wrapping did not significantly reduce the rate of yellow/red colour development but the higher temp. did increase the rate of colour change. Rate of decay development was not affected by wrapping but was lower at 7°C than at 15.5°C for both wrapped and non-wrapped pods. The plastic film provided a modified microclimate inside the cavity of pods during storage shown by higher than normal levels of CO_2 compared to non-wrapped pods. AA

Tomatoes

457 CALVO (C), COSTELL (E) and DURAN (L). Colour of commercial fried tomato sauce. Sensory and instrumental measurement. **Rev. Agroquim. Tecnol. Aliment. 26**(2); 1986; 256-62 (Es)

Colour of commercial samples of canned fried tomato sauce has been studied. Sensory rank data were compared with ranked data from instrumental measurements, carried out in a Hunter LabScan spectrocolorimeter, using non-parametric statistical techniques. Results showed that there are significant differences in colour ($p < 0.01$) among samples. Parameters X, Y, L, b, L and a2+b2 showed good correlation with sensory evaluation of this product's colour. AA

458 GORMLEY (TR), AROLD (G), BURET (M) and DECALLONNE (J). Tomato fruit flavour - An interlaboratory taste panel study. **Food Sci. + Technol. 19**(2); 1986; 144-6

An interlaboratory taste panel study indicated that, in general, taste panelists were able to detect a significant flavour different between two tomato fruit samples when presented as a paired comparison. However, each sample received a relatively similar score when tested as a single sample using a hedonic scoring system. The implications of this findings for the future flavour evaluation of tomatoes at laboratory market and supermarket level are discussed. AA

459 RIVA (M) and POMPEI (C). Evaluation and description of the quality of strained tomatoes. **Ind. 61**(1); 1986; 9-16 (It)

Samples of fourteen brands of "passato di pomodoro" (strained tomatoes) representative of the Italian production in this field were examined for chemical, physical and organoleptic properties. The data obtained were used, after statistical evaluation, to represent the overall quality by QDA charts and by a quality index named QDA score. The results of the study may aid in establishing regulation criteria and quality standards for this new kind of tomato product. AA

460 SIO (F), BOTTIGLIERI (P), LEONI (C), CASTALDO (D), TRIFIRO (A) and FORTINI (G). Rheological behaviour of strained tomatoes prepared by the hot-break procedure. **Ind. Conserve. 61**(1); 1986; 17-21 (It)

The rheological properties of commercial strained tomatoes prepared by the hot-break method were determined with a coaxial-cylinder viscosimeter. The power law and the Casson and Herschel-Bulkley models satisfactorily described the rheological behaviour of the product. The equation of multiple linear regression allowed the τ_0, $K_1 n_1$ and n_1 values of the Herschel-Bulkley model to be determined by means of some physical and chemical parameters. AA

FRUITS

461 PIVA (M), LERICI (CR) and DALLA ROSA (M). Non enzymatic browning (NEB) in stored fruit derivatives. **Ind. Aliment. 25**(4); 1986; 277-83 (It)

Temp. and water activity (a_w) are the main factors affecting non enzymatic browning reactions in food systems. Samples of apricot puree at different a_ws were treated for different time-periods and temp. (50, 65 or 90°C for 15, 30 or 60 min) and the results are reported in this work. The degree of browning has been detected at the end of the heat treatment and during the following storage at room temp. The shelf-life has been calculated by considering 2% of CO_2 in the head space of the sample as a limit of acceptability in regard to browning reactions. AA

Amla

462 GUPTA (GK) and BOPAIAH (MG). An easy way to prepare amla murrabba with high vitamin C content. **Indian Hortic. 31**(2); 1986; 15

An improved process for preparing amla (**Phyllanthus emblica**) murabba is described which involves softening of the fruits by boili with 2% alum solution for 4-5 min followed by dipping in sugar syru The thin syrup is to be conc. by boiling and adding more sugar unt it attains the required consistency. MVG

Apples

463 McLELLAN (MR) and NOGUEIRA (JN). Effect of fruit firmness and processing parameters on apple sauce processing data from R.I. greenin and Rome cultivars. **Food Sci. + Technol. 19**(2); 1986; 172-5

464 ROMOJARO (F), VAILLANT (V), LATCHE (A) and PECH (JC). Influence of D amino acids on the malonylation of the 1-aminocyclopropane-1-carboxy acid (AAC) and on the synthesis of ethylene in apples. **Rev. Agroquim Technol. Aliment. 26**(2); 1986; 213-8 (Es)

465 SUBDEN (RE), KRIZUS (A) and AKHTAR (M). Mutagen content of Canadian apple Eau-de vie. **Can. Inst. Food Sci. Technol. J. 19**(3); 1986; 134-6

Calvados and other French style brandies are aged in wood, have complex bouquet and flavours and some have previously been shown to contain significant mutagen activity. A Canadian apple wine distillate or apple eau-de-vie is a product with little bouquet or flavour and is shown to contain no significant mutagen activity when assayed using four tester strains in the Ames Salmonella/microsome/fecalase mutagen assay. AA

Bananas

466 SEENAPPA (M), LASWAI (HSM) and FERNANDO (SPF). Availability of L-ascorbic acid in Tanzanian banana. **J. Food Sci. Technol. (India) 23**(5); 1986; 293-5

L-ascorbic acid content in cookiong var. of banana (Malindi, Mzuzu, Mshale, and Matoke) was 7.7, 16.0, 6.3 and 10.3 mg/100 g resp. In Sukari and Malindi (ripe), which are the dessert type the ascorbic acid content was 7.9 and 4.4 mg/100 g resp. Boiling and roasting lowered the ascorbic acid content of the unripe Malindi by 39.0 and 68.8% resp. KAR

Berries

467 GREEN (RC) and MAZZA (G). Relationships between anthocyanins, total phenolics, carbohydrates, acidity and colour of Saskatoon berries. **Can. Inst. Food Sci. Technol. J. 19**(3); 1986; 107-13

Raspberries

468 BAZZARINI (R), BIGLIARDI (D), GHERARDI (S), CASTALDO (D), LO VOI (A) and TRIFIRO (A). Analytical characterization of raspberries, blueberries, blackberries and red currants of different orgin. **Ind. Conserve. 61**(1); 1986; 22-8 (It)

Several samples of raspberries, blackberries, blueberries and red currants of Italian and foreign origin were subjected to an analytical investigation which allowed the main chemical parameters of these fruits to be identified. In all four berries fructose occurs in higher amounts than glucose, and sucrose is absent. Blackberries contain high levels of D-isocitric acid and blueberries differ from the other berries for the unusually high quinic-acid content. All the analytical data obtained appear quite useful for evaluating the quality of semifinished products from these fruits. AA

Dates

469 JADDOU (H), AL-HAKIM (M), MHAISEN (MT) and AL-ADAMY (LZ). 'Zahdi' dates as a source of sugar. **J. Food Sci. Technol.** (India) 23(5); 1986; 267-70

Zahdi dates was treated with ethanol (70 to 95% concn) and sugar was extracted, the recovery of which ranged from 5.28-10.56% (as white fine powder) and max. recovery of 10.56% was obtained at 90% ethanol concn. Sugar was also prepared at pilot plant scale; the steps comprised of extraction, filtration, evaporation and crystallization. Recovery of sucrose was 24.4% and 10.3% of the total wt. of dates at half and full maturity of dates resp. KAR

Grapes

470 JACKSON (DI). Factors affecting soluble solids, acid, pH and colour in grapes. **Am. J. Enol. Vitic.** 37(3); 1986; 179-83

Vines were grown from two-node cuttings and induced to retain one bunch of grapes per plant. These plants were grown in a greenhouse and parameters, such as leaf number and area, berry number, Brix , acid, pH, and colour were recorded. Correlations between pairs of variables were made and analyzed. Plants with low berry numbers grew more than those with high numbers. Low berry number, high leaf growth rate, and high leaf/fruit ratio are related to high sugar levels, but acid levels were low and pH levels high. These levels were not simply a response to advanced maturity. While soluble solids levels increased only until a certain leaf/fruit ratio was attained, pH and acid continued to change as the shoots grew. Under the warm conditions of this experiment, unacceptably high pH levels and low acid levels were recorded. The effect of extended shoot growth increasing pH and lowering acid was not mediated by shade and leaf/bunch exposure since shading was not permitted. The general hypothesis that low vigour vines produce higher quality can, therefore, be explained in part by a direct response of pH and acid to shoot growth. AA

471 MOLINA (I), NICOLAS (M) and CROUZET (J). Grape alcohol dehydrogenase. I. Isolation and characterization. **Am. J. Enol. Vitic.** 37(3); 1986; 169-73

An alcohol dehydrogenase (ADH) was extracted from grape berries with dithiothreitol and glycerol present in the extraction medium. The enzyme was purified 297 fold with 81% yield by DEAE cellulose and chromatographies (Blue Sepharose CL-6B). The enzyme so obtained, homogeneous in polyacrylamide gel electrophoresis, can be stored at least one year at -20°C. The optimum pH for grape ADH was found to be 9.2 to 9.3 for ethanol oxidation and 5.8 to 5.9 for acetaldehyde reduction. The iso-electric point was 5.5 ± 0.2. The mole wt values determined by gel filtration, polyacrylamide gradient gel electrophoresis, and SDS polyacrylamide gel electrophoresis are indicative of a dimeric structure for this enzyme which is probably constituted by two identical subunits of MW=45000 ± 2000. Inhibition studies show that grape ADH is a metallo enzyme with SH groups essential for enzyme activity. The results obtained using ethanol as in affinity indicate that during carbonic maceration, the limitation of percent alcohol observed is not related to the inhibitor effect of the ethanol on grape ADH. AA

472 ROUFET (M), BAYONOVE (CL) and CORDONNIER (RE). Changes in fatty acids from grape lipidic fractions during crushing exposed to air. **Am. J. Enol. Vitic.** 37(3); 1986; 202-5

Grape crushing in the presence of air induces a decrease in levels of polyunsaturated fatty acids in the berries and in some lipidic fractions. This phenomenon is particularly noticeable in galactosylglycerides at the veraison stage. The possible existence, in addition to lipoxygenase, of a lipase similar to a galactosylglyceri acylhydrolase is discussed. AA

Mango

473 MILLER (WR), SPALDING (DH) and HALE (PW). Film wrapping mangoes a advancing stages of post-harvest ripening. **Trop. Sci. 26**(1); 1986; 9 17

Mango fruit (**Mangifera indica** cv. Tommy Atkins) wrapped in plastic film when mature, with green peel colour, had more serious deca before reaching the soft-ripe stage and had less yellow colour development of the pulp at soft-ripeness, than non-wrapped fruit held i storage at 21°C. No significant difference was found in wt. loss, pee colour, pulp colour, firmness, decay and time to reach soft-ripenes of mangoes between two different types of plastic film. Total time required for fruit to reach this stage was reduced to 16 days, b wrapping them after the initiation of ground peel colour development from the 20 days required when wrapping mature-green fruit. However non-wrapped mature-green fruit also reached soft-ripe in 16 days Regardless of the post-harvest stage of ripening when film wrappin was applied, fruit tended to have a higher incidence of off-flavour at soft-ripeness than fruit not wrapped and ripened to soft-ripe. AA

Olives

474 LANZA (CM), TOMASELLI (F), RUSSO (C) and NICOLOSI ASMUNDO (C). Pesticide residues after treatments designed to control **Dacus oleae**. 1. Decay of two insecticides on olives. **Ind. Aliment. 25**(2); 1986; 122-4 (It)

The decay of two insecticides (Dimethoate and Chlorpyrifos, conc. 0.06%) used to control **Dacus oleae** infestation in olives has been studied; residues on olives measured periodically up to harvest time, and also in the oil that was subsequently obtained. Analyses were carried out with the help of gas chromatography combined with detection by flame photometry. Dimethoate decayed quickly to levels below the limit of detection in oil; in contrast, large residues of chlorpyrifos were measured on olives as well as in olive oil. KMD

Oranges

475 BEN-SHALOM (N) and PINTO (R). The role of hesperidin in the turbidity of orange albedo aqueous extract. **Food Sci. + Technol. 19**(2); 1986; 158-60

The turbidity of the albedo extract was due to the crystallization of soluble hesperidin with soluble pectin. In this system, some of the hesperidin is soluble and some of it is in an insoluble form and contributes to the turbidity of the albedo extract. The aglycon of the hesperidin did not form any cloud with pectin. Hesperetin glucose was found to exist in the albedo extract and to be a part of the cloud of the albedo. AA

476 CASAS (A) and MALLENT (D). Effects of Figaron (5-chloroindazol-8-acetic acid ethylester) on quality of Naveline oranges and Satsuma mandarins. **Rev. Agroquim. Tecnol. Aliment. 26**(2); 1986; 239-48 (Es)

The quality of Navelina oranges and Satsuma mandarins is improved by the treatment of the trees with Figaron. The best effects were obtained by spraying the trees with 200 ppm Figaron when the average fruit diameter was 25-30 mm and the treeatment was repeated at 20 days. This treatment accelerated disappearnace of the chlorophyll in the rind and increased the soluble solids content in the fruit juice. As a consequence, treated fruits reached the commercial maturity 6-9 days before than non-treated fruits. Experiments were carried out during 1982-83. 1983-84 and 1984-85 seasons. AA

Kinnow

477 KUSHAL SINGH, MANN (SS) and CHANDER MOHAN. Proper storage of Kinnow fruits. **Indian Hortic.** 31(3); 1986; 21

Fruits are dipped in 2% bleaching powder or thiabendazol (500 mg/l) for 2-3 min to prevent decay during storage. Dipping fruits in benlate (500 mg/l) can also reduce spoilage by fungi. The treated fruits can be stored upto 30 days at room temp. (25°C) and upto 85 days at 2.2-4.4°C and 80% RH. The damage due to water loss during storage can be markedly reduced by storing in 100-200 guage polyethyne bags. The palatability of fruits can be improved by treating with 3-6% wax emulsion and drying before storage. MVG

Peaches

478 ALMELA (L), LOPEZ (JM), CANTO (M) and MADRID (R). Drip irrigation in peach trees. Seasonal evolution of pigments, sugars and organic acids. **Rev. Agroquim. Tecnol. Aliment.** 26(2); 1986; 249-55 (Es)

The seasonal evolution of the chlorophylls and carotenoids, sugars and organic acids in peaches (**Prunus persica** L.) of the varieties Sudanell and Maruja, under controlled conditions of fertigation, were studied. The chlorophylls were determined by derivative spectroscopy, and sugars and organic acids by enzymatic methods. The results show that carotenoids/chlorophylls, sacharose/reducing sugars or malic acid/citric acid ratios are more representative of fruit ripening, than pigments, sugars or acids concn individually considered. AA

SUGAR, STARCH AND CONFECTIONERY

479 OOMMEN (TT) and RAJ KUMAR CHODA. Recent innovations in milling technology for reduction of losses. **Indian Sugar.** 36(9); 1986; 457-60

Impact of recent innovations in sugar cane milling technology for reduction of losses and increased sugar recovery has been discussed with particular reference to commendable results achieved by Tamil Nadu Sugar Mills. The latest developments referred to include roller 'arcing' technology and continuous centrifugal for C-massecuite curing. MVG

Fructose

480 MEINCKE (K). Fructose the natural sweetener with many advantages and characteristics. **Conf. Prod.** 52(8); 1986; 519-21

Honeys

481 ROTH (LA), KWAN (S) and SPORNS (P). Use of a disc-assay system to detect oxytetracycline residues in honey. **J. Food Prot.** 49(6); 1986; 436-41

Caramel

482 CAPTAIN (WR). Caramel: Atmospheric and presure cooking. **Manuf. Conf.** 66(9); 1986; 110-16

Discusses ingredient functions (milk, fats; bulking agents) cooking; cooking methods (open kettle, batch kettle); moisture contro; BTUS; continuous atmospheric processing system; continuous pressure cooking; equipment; pressure cook process; control of moisture content and sugar caramel. BV

Chocolates

483 RIEDEL (HR). The manufacture of chocolate and chewing gum coi
Conf. Prod. 52(8); 1986; 542

BAKERY PRODUCTS

Bread

484 ROHLGRUBER (H) and SEIBEL (W). Production defects and their avoidan
in the production of Christmas breads (Stollen). **Getreide Mehl Bro**
40(5); 1986; 145-8 (De)

The most frequent complaints relating to Christmans breads ar
(i) non-uniform shape, (ii) too thick a sugar layer, (iii) non-unifo
pore structure, (iv) a crumb that is too dry or too greasy, and (
unbalanced (or not well-rounded) taste. These defects may be avoide
by the correct selection and checking of raw materials. To obtain th
desired aroma, it is necessary to have a well-balanced dough develop
ment; special attention must be paid to ensure an adequate bakin
time. KMD

485 KABE (E), BRUMMER (J-M) and SEIBEL (W). Changes relating to nutritiv
labelling in the Food Law. Production of special breads. **Getreide Meh**
Brot. 40(5); 1986; 133-40 (De)

Some points in the German Food Law, relating to (i) the calori
fic value of bread, (ii) increase in its contents of protein, fibre
and potassium, and (iii) reduction in the content of protein, sodium
or carbohydrates, have been discussed. Some advice is given on how t
produce breads of different types having desired amounts of the afore
said components. KMD

486 TORTOSA (E), ORTOLA (C) and BARBER (S). Chemical changes during brea
dough fermentation. Lipids of the liquid phase of bread dough. **Rev**
Agroquim. Tecnol. Aliment. 26(2); 1986; 269-75 (Es)

Pasta

487 SCHREURS (E), SEIBEL (W), MENGER (A) and PFEILSTICKER (K). Influenc
of cooking water on the cooking quality of pasta products in relatior
to quality of uncooked pasta. Part 2. Solubility tendencies of pasta
protein, depending on the type of cooking water. **Getreide Mehl Brot**
40(5); 1986; 148-54 (De)

The cooking loss (disintegration) suffered by paste goods, wher
boiled in water, was not always correlated with organoleptic quality
i.e. to say those products that had lower cooking loss did not always
have a lower sensory score. Protein losses in cooking water were minimal when the water was slightly acidic. Addition of common salt to the water had very little effect on the cooked product. But addition of soidum bicarbonate, sodium hydroxide, or tri-sodium phosphate to the water resulted in higher losses of protein. Anions also had a distinct
effect on the cooking loss. Addition of emulsifiers reduced cooking
loss even if the spaghetti was made from soft wheat. Addition of liquid egg to the paste goods did not reduce cooking loss; but addition of liquid egg combined with high-temp. drying resulted in a very great reduction of cooking loss. KMD

Rolls

488 BRUMMER (J.-M), STEPHAN (H), MORGENSTERN (G) and NEUMANN (H)(. Production of fresh, crusty, wheat rolls. **Getreide Mehl Brot. 40**(5);

1986; 140-45 (De)

Many complaints made against crusty wheat rolls may be overcome by ensuring that freshly made rolls are placed on the sales counter more frequently than once a day. Steps that might help to maintain the freshness and crispness of rolls include: (i) refrigeration (or freezing) of the rolls; (ii) interrupted baking method; (iii) freezing of dough pieces (interruption of dough fermentation); (iv) retardation of fermentation by reduced temp. and (v) retardation of fermentation by addition of less yeast, or by additional cooling. Changes in the recipe, and other modifications connnected with these measures are discussed. KMD

Snack

489 NIROJNI BHAT and PADMA UMAPATHY (K). Nutritional evaluation of snack items available for rural pre-school children. **Indian J. Nutr. Diet. 23**(7); 1986; 200-204

The survey was carried out in three nearby villages of Mysore city by questionnaire interview of the shop keepers. Information on the popular snacks, frequency of purchase and the amount spent by a child were collected. Eight snacks (biscuit type I and II, Boti, gingelly toffee, murukku, pepperment with and without groundnut, and puffed rice balls) which are most popular were analysed for proximate principles and for Ca and Fe contents. The snacks worth 10 paise provided a max. of 55 kcal, 0.6 g of protein, 2.87 g of fat, 10.6 g of carbohydrates, 56.66 mg of Ca and 2.15 mg of Fe. DES

MILK AND DAIRY PRODUCTS

490 GANDHI (DN). Commercialisation of fermented milk products manufacturing by small dairy enterprenuers in India. **Indian Dairyman. 38**(3); 1986; 99-104

The author has listed the properties and characteristics of 10 different types of fermented milk products that are being prepared and sold by small entrepreneurs in India and other countries. Methods of preparation as well as analytical values of these products have been indicated. The desired sensory characteristics and types of contamination that may occur have been reported. KMD

491 PATWARDHAN (NP), TORO (VA) and MAJGAONKAR (SV). Seasonal variation in chemical composition of milk under heavy rainfall region of Konkan. **Indian Dairyman. 38**(2); 1986; 69-74

The observation made in monsoon, winter and summer months indicate that fat and total solids contents were significantly higher in cow milk during monsoon months in the milk collected from farmers. The monsoon milk samples from buffalo also contained significantly higher amounts of fat, total solids, and protein. Season showed no influence on the protein content of cow milk. Feeding was shown to have significant effect on this as in the Agricultural college farm where feeding was uniform there was no much variation in the content of fat, protein and total solids between seasons. MVG

492 RHAM (O) and CHANTON (S). Am empirical mathematical model of retentate composition in ultrafiltration of dairy products. **J. Dairy Res. 53**(2); 1986; 271-83

493 SEN (DC). Milk gels and their causes for variations. **Indian Dairyman. 38**(2); 1986; 79-82

Theory of milk gelation has been discussed briefly. The author has also dealt with the factors responsible for firmness of the ge enzyme activity in and microbiological quality of raw milk; stora conditions; effect of cold storage of milk prior to sterilization, a presence of additives. MVG

494 SHAH (RK), PRAJAPATI (JB) and DAVE (JM). Innovations in acidophil product technology. **Indian Dairyman.** 38(1); 1986; 21-3, 26-9

This review covers: forms of acidophilus milk products; dri acidophilus products; milk-cereal fermented foods; spray-dried acid philus-malt preparation; and spray-dried acidophil milk-banana-tomato-juices preparation. MVG

495 WOOLLARD (DC). Nitrate and nitrite in dairy products: A perennia problem. **Food Technol. NZ.** 21(4); 1986; 31

Milk

496 AUMONT (G) and TRESSOL (J-C). Improved routine method for the deter mination of total iodine in urine and milk. **Analyst.** 111(7); 1986 841-3

A simple routine method for the determination of iodine in bio logical fluids is proposed. Destruction of organic matter by alkalin ashing is carried out prior to determination by the Sandell and Kol thoff reaction. The precision is below 8% for urine and milk. Iodin contents as low as 2 ng g-1 (p.p.b.) can be detected. AA

497 JOSHI (RM) and PATEL (AA). Heat-induced deposit formation and its re lationship to heat stability in a blend of recombined and fresh milk **J. Dairy Res.** 53(2); 1986; 323-8

498 LONNERDAL (B). Dietary factors affecting trace element bioavailability from human milk, cow's milk and infant formulas. **Progr. Food Nutr Sci.** 9(1/2); 1985; 35-62

Review. 150 references. KAR

499 McKELLAR (RC) and CHOLETTE (H). Determination of the extracellular lipases of **Pseudomonas fluorescens** spp. in skim milk with β-napthy caprylate assay. **J. Dairy Res.** 53(2); 1986; 301-12

500 NEEDS (EC), ANDERSON (M) and MORANT (SV). Interaction of factors which influence the extent of lipolysis during milking and storage of raw milk. **J. Dairy Res.** 53(2); 1986; 203-10

501 UBERTALLE (A) and MASSARI (M). Aspects and prospects of goat's milk consumption. **Ind. Aliment.** 25(2); 1986; 119-21 (It)

502 WEST (DW). Structure and function of the phosphorylated residues of casein. **J. Dairy Res.** 53(2); 1986; 333-52

Discusses: phosphorylation of the casein; determination of the position of phosphorylated residues; structure of the kinase recognition sites; limits to the extent of phosphorylation; properties of the casein kinase; importance of the casein phosphoseryl residues to the structure, function and properties of milk; formation of micelles and binding of calcium; technological importance of casein phosphorylation; and biological significance of casein phosphorylation. BSN

503 YAMAMOTO (A), TOYOSAKI (T) and MINESHITA (T). A mechanism for non-Newtonian flow of milk in a capillary. **J. Texture. Stud.** 17(2); 1986; 205-20

Cheese

504 CANTONI (C), CATTANEO (P) and BALZARETTI (C). Production of Staphylococcal enterotoxins by Staphylococci isolated from cheese. **Ind. Aliment.** 25(237); 1986; 291-5 (It)

The biosynthesis of enterotoxins by **Staph. aureus** strains isolated from toxic cheese was investigated. ELISA method has been used and enterotoxins A and D have been detected. AA'

505 DYBING (ST), BRUDVIG (SA), WIEGAND (JA) and HUANG (EA). A simple method for estimating the extent of surface crystal development on coloured cheddar cheese. **J. Food Prot.** 49(6); 1986; 421-2

506 FERNANDEZ-SALGUERO (J) , FLORIDO (S) and MARCOS (A). Contribution to the study of the lipid fraction of some commercial ripened cheeses. **Rev. Agroquim. Technol. Aliment.** 26(2); 1986; 283-90 (Spanish)

The fatty acid composition of 31 samples of Spanish cheeses (varieties Tetilla, Mahon, Idiazabal, Torta del Casar and Majorero) has been determined by gas-liquid chromatography. The fatty acid composition of the cheeses is proportionately the same as that of the milks from which they are made, with the exception of Idiazabel cheese which was found to contain both cow- and goat-milk. Twenty-four fatty acid ratios (two acids at a time) were calculated for the Mahon, Torta del Caser, and Majorero varieties, which are made from cow, sheep, and goat-milk resp. The following ratios were found to be useful in their differentiation: C_{14}/C_8, C_{14}/C_{10} , and C_{16}/C_{10}. KMD

507 FONT de VALDEZ (G), SAVOY de GIORI (G), PESCE de RUIZ HOLGADO (A) and OLIVER (G). An orange-reddish pigmentation in Roquefort cheese. **J. Food Prot.** 49(6); 1986; 412-6

Development of an anomalous orange or reddish colouration in cheeses has been studied in relation to the coryneform microorganisms present during cheese manufacture and maturation was studied. MVG

508 GREEN (ML). Effect of replacing part of the sodium chloride in cheddar cheese by sodium or potassium phosphates on ripening, flavour and texture. **J. Dairy Res.** 52(2); 1986; 329-32

509 MARSHALL (RJ). Increasing cheese yields by high heat treatment of milk. **J. Dairy Res.** 53(2); 1986; 313-22

510 SINGH (S) and TIWARI (BD). Recent developments in drying of cheese. **Indian Dairyman.** 38(1); 1986; 13-9

This review covers: principle of cheese drying; methods of cheese drying; cheese spread powder; extrusion drying; freeze-drying; and drying of a casein-fluid system with cheese flavour. MVG

Cultured milks

511 HOSONO (A), OMOTE (E), IZAWA (Y), TOKITA (F) and KADA (T). Isolation of spontaneous induced-streptomycin dependent mutants of Salmonella typhimurium TA98 and TA100 strains and desmutagenicity tests **in** vitro of cultured milk. **Food Sci. + Technol.** 19(2); 1986; 161-3

For the purpose of obtaining a strain with a market that could be used in AMES system for samples containing histidine, we isolated streptomycin dependent mutants of **Salmonella typhimurium** TA98 and TA100. One streptomycin mutant (EM-3) was isolated from the TA100 and one (EM-510) from the TA98. These mutant strains were induced SM SMind by typical mutagens like 2-(2-furyl)-3-(5-nitro-2-furyl) acrylamide (AF2) and 4-nitroquinoline-N-oxide (4NQO). Desmutagenic activities of cultured milk against AF2 and 4NQO were found in plate tests using the EM-3 and EM-510 strains. AA

512 NAGARAJA (C) and VISHWESHWARAIAH (L). Migration of lead into dahi prepared in earthern containers. **J. Food Sci. Technol. (India) 23**(5); 1986; 296-8

Locally made earthen pots which are commonly used in rural households for keeping dahi and buttermilk was procured from the local market and dahi was prepared by putting milk inside the container and inoculating with lactic culture (2%) inside the pot. Analysis done after 14 h (pH 4.68) indicated a Pb content (p.p.m.) of 1.743 in dahi stored in earthen pot compared to 0.770 found in dahi stored in glass bottles. KAR

Khoa

513 BHADANIA (AG), PATEL (SJ) and SHAH (US). Use of roller dryer for manufacture of khoa. **J. Food Sci. Technol. (India) 23**(5); 1986; 295-6

Khoa was prepared from unhomogenized and homogenized buffalo milk containing 5.0% fat by conc. to 50-55% total solids in a double jacketted stainless steel kettle followed by drying in a lab. scale roller dryer. Organoleptic evaluation of the khoa showed that colour, body and texture were comparable to the khoa made by the conventional method. Homogenization did not improve the flavour and taste of khoa except improving the colour. Roller dried khoa scored less than the control in flavour and appearance, but the product was acceptable. KAR

Paneer

514 PATIL (GR) and GUPTA (SK). Some aspects of sensory evaluation of paneer. **Indian Dairyman. 38**(3); 1986; 135-40

A fairly detailed report has been made of the methodology employed for sensory evaluation of paneer (Indian cottage cheese). Tempering of paneer, sequence of observations, desirable and undesirable ssensory characteristics, score-card, and guidelines for evaluation of various attributes have been reported in some detail. MVG

Whey

515 LANGLEY (KR), MILLARD (D) and EVANS (EW). Determination of tensile strength of gels prepared from fractionated whey proteins. **J. Dairy Res. 53**(2); 1986; 285-92

Yoghurt

516 BOSSET (JO), DAGET (N), DESARZENS (C), DIEFFENBACHER (A), FLUCKIGER (E), LAVANCHY (P), NICK (B), PAUCHARD (J-P) and TAGLIAFERRI (E). The influence of light transmittance and gas permeability of various packing materials on the quality of whole natural yoghurt during storage. **Food sci.+ Technol. 19**(2); 1986; 104-16

The work describes the evolution of certain physical, chemical and sensorial characteristics of solid whole natural yoghurt during storage and evaluates the protective effect of 5 types of different containers. The experimental conditions were as follows: temp. 8°C; lighting at 0 and 2000 lux; storage time up to 24 days, packaging of 180 g in either glass jars (transparent, colourless or brown) - or polystyrol cups (transparent, colourless or brown, or covered with cardboard); in an upright or upside down position. The following measurements were carried out: some checks on the chemical and microbiological composition; pH, pO_2, pCO_2, and CO_2; colour L, a, b,; L+ and D- lactic acid; carboxylic acids; free amino acids; amines; peroxide value, vitamins A, B_2 and B_{12}; volatile components; sensory tests; transmittance spectra of packing materials. Significant differences in the changes of the product were noted as a function of the conditions of storage. The brown coloured containers or those with cardboard were found to provide better protection than those which were transparent and colourless. Up to 2 weeks of storage, the differences in light transmittance were more important than the differences in gas permeability. AA

MEAT AND POULTRY

517 MALISCH (R). Multi-method for the determination of residues of chemotherapeutics, antiparasitics and growth promoters in foodstuffs of animal origin. Part II. Determination of nitrofuranes and nicarbazin (the dinitrocarbanilide containing component). **Z. Lebensmittel-Unters. Forsch. 183**(4); 1986; 253-66 (De)

Nitrofurans and dinitrocarbanilide are extracted from food according to the multiresidue method and detected by Reversed-phase-HPLC with UV-detection at 360 nm. Records of the UV-spectra confirm the results qualitatively. Possibilities for further confirmation are discussed. Substances in amounts < 0.01 mg/kg can only be determined with particular care. Statistical confirmation of this method and possible problems are mentioned. An interlaboratory collaborative study confirmed the method; furazolidone, furaltadone, nitrofurazone, nitrofurantoin, and nicarbazin (the dinitrocarbanilide containing component) were added to homogenized eggs in amounts of 0.005-0.150 mg/kg. The procedure can be standardized as an official analytical method at a detection limit of 0.005 mg/kg for nitrofurans and 0.01 mg/kg for nicarbazin. AA

518 WAGNER (MK). Phosphates as antibotulinal agents in cured meats: A review. **J. Food Prot. 49**(6); 1986; 482-7

Beef

519 BERNAL (VM) and STANLEY (DW). Examination of a commercial restructured beef product using scanning electron microscopy. **Can. Inst. Food Sci. Technol. J. 19**(3); 1986; 137-9

520 BERRY (BW), SMITH (JJ) and SECRIST (JL). Effects of connective tissue levels on sensory, instron, cooking and collagen values of restructured beef steaks. **J. Food Prot. 49**(6); 1986; 455-60

521 MAZZOLA (P), CINDIO (B), MIGLIOLI (L), MASSINI (R), DIPOLLINA (G), PEDRELLI (T) and ROMANO (V). Application of the finite-element method to the sterilization of canned beef homogenate. **Ind. Conserve. 61**(1); 1986; 3-8 (It)

The finite-element method has been applied to the calculation of temp. profiles occurring in the heating and in the cooling stages of the sterilization of a tinplate can filled with beef homogenate. Theoretical and experimental data are in good agreement. Finally a method is presented for the calculation of the lethal effect integrated over the entire volume of the container. The method is based on the calculation of the changes in the bacterial load with time, carried out for the different elements into which the container is divided. AA

Cow

522 HAWRYSH (ZJ), SHAND (PJ) and WOLFE (FH). Effects of low voltage electrical stimulation on the quality of the round from young and mature cows. **Can. Inst. Food Sci. Technol. 19**(3); 1986; 121-9

Pork

523 FUKUSHIMA (H) and GOMYODA (M). Inhibition of **Yersinia enterocolitica** serotype 03 by natural microflora of pork. **Appl. Environ. Microbiol.** 51(5); 1986; 990-94

Yersinia enterocolitica serotype 03 did not grow but did survive in inoculated raw ground pork kept at 6 and 25° C. The antagonistic effect of microbial flora, especially **Hafnia alvei** and environmental **Yersinia** organisms, on the growth of **Y. enterocolitica** serotype 03 in raw ground pork was evident. These results were supported by evidence of the inhibition of growth of **Y. enterocolitica** serotype 03 by **Enterobacteriaceae**, especially **H. alvei** and environmental **Yersinia** organisms, in mixed cultures at 6 and 25°C. We suggest that naturally contaminated pork is a source of human infection, since **Y. enterocolitica** serotype 03 was capable of surviving in the raw pork for a long time. AA

Bologna

524 NIELSEN (H.-JS) and ZEUTHEN (P). Influence of a partial replacement of sodium chloride with potassium chloride in a vaccum-packed bologna-type sausage. **Food Microbiol.** 3(2); 1986; 143-9

Bologna-type sausage was produced using NaCl or mixtures of NaCl and KCl, where NaCl was replaced by KCl on the basis of equal wateractivity. Slicing and packaging was done at a commercial manufacturer and packages stored at 2, 5, 8, 10, 20 and 25°C. Generally the numbers of total aerobic bacteria, **Brochothrix thermosphacta**, lactic acid bacteria, Gram negative bacteria and yeast were not significantly affected by its substitution. The increase in numbers was related to storage temp. and also to numbers present at the time of packaging. Partial replacement of sodium with potassium therefore seems to have no influence on microbial growth in this type of product. AA

525 NIELSEN (H.-JS) and ZEUTHEN (P). Growth studies of spoilage and pathogenic bacteria in vacuum-packed bologna-type sausage produced with NaCl or mixed NaCl and KCl. **Food Microbiol.** 3(2); 1986; 151-5

Bologna-type sausage was produced with NaCl or NaCl/KCl mixture to give equal water activities (aw), inoculated with pure cultures of **Brochothrix thermosphacta**, **Serratia liquefaciens**, lactic acid bacteria, **Bacillus cereus** or **Yersinia enterocolitica**, and incubated at suitable temp. for growth. There was no significant differences between series with NaCl only or mixed salts during storage. Indicating that no microbiological problems occur when half of the NaCl is replaced with KCl to provide the same water activity. AA

Ham

526 KEMP (JD), LANGLOIS (BE), FOX (JD) and NICASTRO (F). Quality of dry-cured hams produced from pre-frozen hams as affected by mechanical trenderization and vacuum packaging. **J. Food Prot.** 49(6); 1986; 417-20

The feasibility of using needle-tenderisation and vacuum packaging in the production of aged dry-cured hams has been considered. MVG

Poultry

527 BAILEY (JS), THOMSON (JE), COX (NA) and SHACKELFORD (AD). Chlorine spray washing to reduce bacterial contamination of poultry processing equipment. **Poult. Sci.** 65(6); 1986; 1120-23

In a commercial plant when chlorine was not used for 4 hr the total plate count (TPC) averaged 40,000 bacteria/cm^2, when chlorine was not used only for 2 h the TPC averaged 4000/cm^2, when chlorine was supied at 20- ppm TPC averaged 400/cm^2, when supplied at 70 ppm TPC averaged 3/ cm^2 Surfaces that came in direct contact with carcasses showed higher TPC than surfaces exposed only to run off of carcasses with wash water. KAR

528 LILLARD (HS). Distribution of "attached" **Salmonella typhimurium** cells between poultry skin and a surface film following water immersion. **J. Food Prot. 49**(6); 1986; 449-54

529 STECCHINI (M) and CASERIO (G). Compared study of three medium for the isolation of salmonellas from mechanically deboned poultry and turkey meat. **Ind. Aliment. 25**(4); 1986; 284-8 (It)

Therelative efficiencies of Rappaport-Vassiliadis medium with soy peptone (soya-RV), Selenite cystine broth (SC) and Tetrathionate brilliant green broth (TBG) for the isolation of salmonellas from mechanically deboned poultry and turkey meat, were compared. From 60 samples, 48 were found positive with soya-RV medium, 27 with SC-broth whereas only 15 with TBG-broth. The superiority of soya-RV medium concerned the number of positive samples and also the suppression of "false positive" colonies on the selective solid media. AA

Chicken

530 ACTON (JC), FERGUSON (LB) and DICK (RL). Effect of oxygen transmission rate of packaging films on colour stability of vacuum packaged chicken bologna. **Poult. Sci. 65**(6); 1986; 1124-8

Chicken bologna slices were vacuum packaged in 5 packaging films with oxygen transmission rates of 2 to 55 cc O$_2$/m^2/24–hr. Samples were evaluated for changes in colour during 8 wk. storage period at 3±1° C and 180 to 200 ft -c of continuous lighting. Bologna surface colour, total sample (homogenate) colour, and nitric oxide heme pigment contents were determined. No significant colour loss or fading of bologna redness was apparent from homogenate evaluations after 8 wks of lighted display. KAR

531 BAKER (RC), QURESHI (RA) and HOTCHKISS (JH). Effect of an elevated level of carbon dioxide containing atmosphere on the growth of spoilage and pathogenic bacteria at 2, 7 and 13° C. **Poult. Sci. 65**(4); 1986; 729-37

The 80% CO$_2$ atm. substantially retarded the growth of total bacterial load in uninoculated ground chicken meat and parts at 2, 7 and 13°C when compared to air, however, temp. had a larger overall effect than atm. This study does not indicate that modified atm. packaging of refrigerated poultry in elevated CO$_2$ atm. increases the microbial hazards when compared to air at the same temp. KAR

532 NOLEAU (I) and TOULEMONDE (B). Quantitative study of roasted chicken flavour. **Food Sci. + Technol. 19**(2); 1986; 122-5

Over 300 aroma components have been isolated by earlier authors from cooked, fried, or wasted chickens, but only 53 have been estimated quantitatively. The authors have reported the contents of over 180 known compounds and 6 unidentified compounds in the skin, meat, and edible portion of heated chicken. KMD

533 WOOLLEY (SC), BORTHWICK (FJW) and GENTLE (MJ). Tissue resistivities and current pathways and their importance in pre-slaughter stunning of chickens. **Br. Poult. Sci. 27**(2); 1986; 301-6

The resistivity of tissue from a wide variety of tissues of adult chicken was measured in order to predict the probable pathway followed by the current during electrical stunning. MVG

Broilers

534 ABASIEKONG (SF). Early prediction of performance in broilers: Relationship between length of tarsometatarsus and weight grain. **Br. Poult. Sci. 27**(2); 1986; 345-7

535 KOTULA (KL) and HEATH (JL). Effect of tumbling chill-boned and hot-boned broiler breasts in either acetic acid or sodium chloride solutions on cooked yield, density, and shear values. **Poult. Sci. 65**(4); 1986; 717-25

Tumbling chill-boned breasts in 4% NaCl solutions increased tumbling solution gains and tumbling in concn of 1 and 2% reduced solution gains when compared with samples tumbled in water. These gains were lost when the product was cooked in water. Tumbling chill-boned broilers in acetic acid solutions increased solution gains in breasts tumbled in 5 and 10% NaCl concn. Cooking losses were largest after cooking breasts tumbled in 10% acetic acid followed by 5% treatment. KAR

536 MELTZER (A). Efficiency of effect of high ambient temperatures on food utilisation in male broilers. **Br. Poult. Sci. 27**(2); 1986; 349-51

537 SAMS (AR), DUKES (MG) and JANKY (DM). Tenderness and sensory evaluation of pectoralis superficialis from broilers chilled in potassium chloride, sodium chloride, or neobakasal salt substitute. **Poult. Sci. 65**(4); 1986; 738-41

Salt chilling significantly decreased shear values (improved tenderness), increased moisture content, and increased chloride ion content of the meat tissue. Only NaCl-chilled carcasses had significantly increased sodium levels in the meat tissue. KAR

Ducks

538 MEAD (GC), GRIFFITHS (NM), GREY (TC) and ADAMS (BW). The keeping quality of chilled duck portions in modified atmosphere packs. **Food Sci. + Technol. 19**(2); 1986; 117-21

Four packaging treatments were compared for their effects on the microflora and keeping quality of duck portions held at 1 C. With portions stored in a stretch-wrap film, slight "off" odours were detected in the raw product at 14 days when pseudomonads had reached $> 10^8$/g and there was a parallel deterioration in cooked-meat flavour. In contrast, the use of gas-packs containing either 20 or 80% CO_2/N_2 in N_2 permitted the development of a slower-growing, lactic microflora and although changes in odour and flavour also occurred more slowly under these conditions, there was no obvious association between the two. However, such packs were considered unsuitable for commercial use because of rapid changes in the appearance of the product. The problem was not encountered with packs containing 20% CO_2, in air but, in this case, pseudomonads grew more readily and changes in both odour and flavour were apparent by day 21. AA

Eggs

539 AWAZUHARA (H) and NAKAMURA (R). Comparison of the foaming properties between egg yolk and albumen. **Food Sci. + Technol. 19**(2); 1986; 180-83

To clarify the characteristics of the foaming properties of egg yolk comparisons were made between yolk and albumen. Foaming power of yolk was a little higher than that of albumen, but the foam stability of yolk was much smaller than that of albumen. Effects of pH change and salt addition on the foaminess of yolk were much larger than those of albumen. Although the addition of oil dramatically decreased the foaminess of albumen, the foaminess of yolk was little affected with the presence of oil. The foaminess of albumen decreased with the addition of small amounts of yolk, but the foaming power of albumen increased again with further addition of yolk. AA

540 HUGHES (BO), GILBERT (AB) and BROWN (MF). Categorisation and causes of abnormal egg shells: Relationship with stress. **Br. Poult. Sci. 27**(2); 1986; 325-37

541 IZAT (AL), GARDNER (FA) and MELLOR (DB). The effects of age of bird and season of the year on egg quality. II. Haugh units and compositional attributes. **Poult. Sci. 65**(4); 1986; 726-8

Haugh mites decreased significantly and egg wt increased singificantly as age of the bird increased. No seasonal effects on egg wt or Haugh units were observed. Yolk wt and percentageof yolk increased significantly as the bird aged. Albumen wt. increased as the age of bird increased whereas percentage of albumen decreased due to the increase in percentage of yolk associated with increasing age of bird. KAR

542 YANNAKOPOULOS (AL) and TSERVENI-GOUSI (AS). Quality characteristics of quail eggs. **Br. Poult. Sci. 27**(2); 1986; 171-6

The study showed that the eggs' characteristics were modified as the quails aged and the best criterion of the shell's strength was the shape of the egg. MVG

SEAFOODS

Fish

543 CANTONI (C), CATTANEO (C) and FABBRIS (F). Identification of PCBs in freshwater fishes. **Ind. Aliment. 25**(235); 1986; 125-7 (It)

In some freshwater fishes 2,4,4'trichlorobiphenyl, 2,2',5,5' tetrachlorobiphenyl, 2,4,5,2',5' pentachlorobiphenyl, 2,4,5,2',4',5' hexachlorobiphenyl, 2,3,4,2',4',5' hexachlorobiphenyl have been found. AA

544 KOLI (AE), WHITEMORE (R) and CONYERS (W). Effects of aquatic toxic trace elements on the quality of foodfish. **J. Indian Chem. Soc. 63**(5); 1986; 535-6

Levels of 11 trace elements - Fe, Zn, Cu, NI, G, Hg, Mn, Mg, Ca, Na, K - present in 12 common sp. of fish caught off the Atlantic coast of South Carolina have been measured and are reported. Large fish had higher concn. of these elements than small fish of the same sp.; salt-water fish had higher levels of trace elements than fresh-water fish. KMD

545 MENON (MVR). UVWT system - A case study for application in fisheries industry. **Seafood Exp. J. 18**(10); 1986; 19-20

This note on ultra-violet water treatment systems (i.e. disinfection of water by UV radiation) points out the usefulness of such an instrument in a fish processing industry. KMD

Catfish

546 PIRAZZOLI (P), AMBROGGI (F), INCERTI (I) and CASTELVETRI (F). Study on the possibility of industrial utilization of freshwater catfish (**Ictalurus melas** R.). II. Stability during refrigerated and frozen storage. **Ind. Conserve. 61**(1); 1986; 29-33 (It)

The keeping quality of freshwater catfish during refrigerated

and frozen storage was studied. Freshness was assessed by microbiolo
ical, chemical (pH, total volatile N, rancidity) and sensory analyses
To evaluate stability to frozen storage, the samples were analyzed fo
proximate composition, pH, rancidity, total volatile N and solubl
protein. The results are reported and discussed. AA

Cod

547 FONTE (DJB), ROOZEN (JP) and PILNIK (W). Effect of irradiation on th
stability of minced cod, with and without hydrocolloids during froze
storage. **Food Sci. + Technol. 19**(2); 1986; 167-71
Minced fillets of cod were used to determine the effects of
low dose of irradiation (300 krad, -20°C) on the stability of th
minces during frozen storage. Texture, water holding capacity, lipi
oxidation, production of dimethylamine and formaldehyde and lipi
hydrolysis were evaluated at regular intervals during 3 months o
post-irradiation frozen storage (-18°C). Combinations of irradiatio
with 0.5% cryoprotective additives (Xanthan, Carboxymethyl cellulos
and Iota carrageenan) were also studied. During 3 months of froze
storage theirradiated samples did not present any major change in com
parison with the non irradiated ones. As before, Xanthan
Carboxymethyl cellulose and Iota carrageenan showed their stabilizin
effect on texture and cook drip loss. AA

Oysters

548 BOUTIN (BK), SPAULDING (PL) and TWEDT (RM). Evaluation of the entero
pathogenicity of **Klebsiella pneumoniae** isolates from summer-harveste
Louisiana oysters. **J. Food Prot. 49**(6); 1986; 442-4
Klebsiella pneumoniae isolates were recovered in increased num
bers from oysters harvested during the warm months of the year fro
approved and classified waters. A total of 76 oyster isolates was exa
mined using **in vivo** and **in vitro** assays. The nonpathogenic response
of the strains studied suggest that environmental strains are not
public health risk. AA

Salmon

549 STERSKY (AK), SZABO (R), TODD (ECD), THACKER (C), DICKIE (N) an
AKHTAR (M). **Staphylococcus aureus** growth and thermostable nucleas
and enterotoxin production in canned salmon and sardines. **J. Foo
Prot. 49**(6); 1986; 428-35
S. aureus growth, enterotoxin and TNase production under anaero
bic conditions resembling post process leakage (PPL) of canned salmo
and sardines were studied and the olfactory and visual changes of th
products upto 24 months of storage at room temp. were followed. MVG

PROTEIN FOODS

550 BEACH (RC) and MENZIES (I). Determination of lactulose and soy oligo
saccharides in infant formula milk feeds. **J. Dairy Res. 53**([illegible]); 1986
293-9
A paper chromatography technique is described for the separatio
and quantification of minor sugars in infant formula milks. The preci
sion and reliability of the technique are described. Infant milk feed
of various types were analysed and found to contain up to 11.4 mmol/
of the non-absorbed sugar lactulose. Soy derived feeds may contain
significant residue of non-absorbable oligosaccharides. AA

FRUIT JUICES AND BEVERAGES

Fruit juices

551 DIEHL (JF). Radioactivity in foodstuffs - Status report. **Flussiges Obst. 53**(7); 1986; 344-8 (De)

The author has described how radioactivity, once released, may spread in the environment and be transmitted along the food chain. This essay has been written after the nuclear disaster at Chernobyl in the USSR. KMD

Blackcurrant juices

552 WALD (B), GALENSA (R) and HERRMANN (K). Detection of adulteration of black currant products with blackberry juice, by determination of flavonoids with HPLC. **Flussiges Obst. 53**(7); 1986; 349-52 (De)

Quercetin-3-D-B-glucuronide is an appropriate indicator for the detection of adulteration of black currant (**Ribes**) products with blackberry (**Rubus**) juice. The extracts are purified with the help of polyamide columns, and analyzed by HPLC. Non-derivatised extracts are used. Quercetin-3-O-β-glucuronide, which indicates the aforesaid adulteration, was detected in a certain number of black currant nectars. KMD

Cherry juices

553 SCHMID (W) and GROSCH (W). Quantitative analysis of the volatile flavour compounds having high aroma values from sour (**Prunus cerasus** L.) and sweet (**Prunus avium** L.) cherry juices and jams. **Z. Lebensmittel Unters. Forsch. 183**(1); 1986; 39-44 (De)

The analysis results for seven of the aroma compounds obtained by vacuum distillation from sweet and sour cherry products were compared. The freshly pressed juices from 5 var. of sour and 5 var. of sweet cherries showed great differences in concn (µg/l): benzaldehyde (18-393), linalool (0.5-1.7), hexanal (0.3-54.7), 2(E)-hexenal (2.4-220), 2(E)-6(Z)-nopnadienal (0.1-2.4), phenylacetaldehyde (2.1-5.6) and eugenol (1.0-22.2). The cherry jam showed a drastic change in the aroma composition: benzaldehyde and linalool increased greatly (7 and 13-times, respectively), while hexanal, 2(E)-hexenal and phenylacetaldehyde strongly decreased. KMD

Cocoa

554 TARKA (SM) Jr., APPLEBAUM (RS) and BORZELLECA (JF). Evaluation of the teratogenic potential of cocoa powder and theobromine in New Zealand white rabbits. **Food Chem. Toxicol. 24**(5); 1986; 363-74

Studies were conducted to determine the teratogenic potential of theobromine (TBR) and cocoa powder (CP) in rabbits. TBR was given either by gavage at dose levels of 0, 25, 75, 125 or 200 mg/kg body wt./day or administered in the diet at 0, 0.0625, 0.125 or 0.1875% (approx. 0, 21, 41 or 63 mg/kg/day, respectively). CP was given at 2.5, 5.0 or 7.5% of the diet (approx. 25, 50 or 75 mg methylxanthines/kg body wt./day). The duration of exposure was from days 6 to 29 of gestation. Significant maternal mortality (40%) and reduced food consumption were observed at 200 mg TBR/kg/day. Mean foetal wt were similar to those of the control group at 25 or 75 mg TBR/kg/day, but decreases in foetal body wt. and increases in various malformations and developmental variations were observed in groups given 125 or 200 -mg/kg/day. Insufficient litters were available for examination in the 200/MG/KG day dose group because of maternal toxicity/lethality (repetitive exposure by gavage to 200 mg TBR/kg approached the maternal LD_{50}). In the dietary CP studies, three does died and three aborted, but these deaths and abortions were not treatment related. No maternal deaths occurred during dietary TBR exposure. Maternal wt. gain and food consumption, and the mean number of corporalutea were unaffected by either dietary CP or TBR.Neither foetotoxicity nor teratogenicity was associated with dietary ingestion of CP or TBR. KAR

555 TARKA (SM) Jr., APPLEBAUM (RS) and BORZELLECA (JF). Evaluation of the perinatal, postnatal and teratogenic effects of cocoa powder and theobromine in Sprague-Dawley/CD rats. **Food Chem. Toxicol. 24**(5); 1986; 375-82

Studies were conducted to evaluate the effects of cocoa powder (CP) and theobromine (TBR) on perinatal and postnatal parameters and to assess their potential teratogenicity in the rat. In the peri/postnatal study, CP was given at 0, 2.5, 5.0 or 7.5% in the diet throughout gestation and lactation (postnatal day 21). In the teratology study, rats were given diets containing 0, 2.5 or 5.0% CP or 0.0675 or 0.135% TBR on days 6-19 of gestation. The CP-treated dams in the peri/postnatal study consumed significantly more food than did the controls during gestation. Weight gain was increased only in the 5.0 and 7.5% CP groups during lactation. Litter size was reduced slightly at 7.5% CP and pup survival was slightly decreased at 5.0 and 7.5%. CP but none of these reductions was statistically significant. In the teratology studies, rats given 2.5 or 5.0% CP or 0.0675 or 0.135% TBR consumed significantly more food than did the controls and the CP-treated dams gained significantly more wt. The percentage of pregnant dams and the mean number of corporalutea were not affected by either CP or TBR. We conclude that any variations observed in these studies may be attributed to this non-specific maternal toxicity and are not related to the ingestion of either CP or TBR. KAR

Coffee

556 HAFFKE (H) and ENGELHARDT (UH). Chlorogenic acids in coffee substitutes. **Z. Lebensmittel Unters. Forsch. 183**(1); 1986; 45-6 (De)

Chlorogenic acids in coffee substitutes were determined by reversed phase HPLC with gradient elution (2% acetic acid/methanol) on RP-18. In green barley malt no chlorgenic acids could be detected, n-Chlorogenic acid could be detected in roasted chicory and in two commercial samples (one mixture of coffee substitutes, one instant product); the concn ranged from 0.08 to 0.33 g/kg dry wt. In dried chicory, 1.93 g/kg D.M. total chlorogenic acids were determined and 6 isomers (3-CQA, 4-CQA, 5-CQA, 3,4-diCQA, 3,5-diCQA, 4,5-diCQA) were present. AA

Tea

557 ULLAH (MR). Lowering enzyme activity of tea leaf on storage and withering and its effect on quality of made teas. **Two bud. 32**(1&2); 1985; 53-6

Tea shoot were stored in bamboo basket or spread on hessain tat for 3 and 18 h resp. The moisture content was 79.1 % in bamboo bakset and 71.9% in hessain tat compared to 80.3% for fresh leaves. Polyphenol oxidase (PPO) activity of the tea shoots depressed during withering; however this does not become a limiting factor in oxidizing the available substrate (polyphenols) of tea shoots. Loss of moisture by 7-10% in 1 h of drying considerably reduced the PPO activity but a 15-18% loss of moisture in 3 h drying reduced the PPO by 50-53%. Total oxygen uptake was also reduced by such loss in moisture content of shoots. The loss in PPO during withering however could be restored by rehydration. MVG

558 ULLAH (MR). Aroma constituents of Assam and China hybrid teas and their manifestation during tea processing. **Two Bud 32**(1/2); 1985; 60-62

Relative concn of aroma constituents (linalool, **t**-linalool oxide, **t**-2-hexenol, **c**-3-hexenol, **t**-2-hexenal, **n**-hexanal, phenylacetaldehyde and methyl butanal) was determined by gas chromatography in China hybrid (TV 17) and Assam type (TV 12) Orthodox and C.T.C. black teas. TV 17 had higher concn of phenylacetaldehyde, linalool, and **trans**-linalool, but **cis**-3-hexenol which imparts a fresh green leafy odour was less. Orthodox process produced more of linalool, **trans**-linalool oxide, **trans**-2-hexenol and **cis**-3-hexenol than the C.T.C. process, whereas **trans**-2-hexenal, n-hexenal and phenylacetaldehyde were higher in C.T.C. process. The levels of the aroma constituents are higher in early part of the season (June-Aug.) after which it falls off and at the end of the season (Oct.-Nov.) substantial depressions in the concn of the volatiles occur. Tea tasting panel detecting high quality and flavour in TV 17 orthodox tea sample corresponding to July 13 which had the highest concn. of linalool and **trans**-linalool oxide. MVG

Whisky

559 LAVERY (M), CHAMBERLAIN (H) and BERRY (DR). Use of a small scale insulated fermentation to simulate the scotch malt whisky fermentation. **Food Microbiol. 3**(2); 1986; 157-9

A small scale malt whisky fermentation has been carried out in an insulated fermentation system. The temp. of the fermentation was found to increase during the growth phase in a manner which resembled a large scale fermentation. In this fermentation the yeast viability decreased to 60% and the level of bacterial contamination increased. AA

Wines

560 BERG (LA), GODWIN-AUSTEN (G) and ROBISON (K). Effect of fibers added during pressure leaf filtration on the membrane filterability of white table wines. **Am. J. Enol. Vitic. 37**(3); 1986; 174-8

Three fibres (CLR-cotton cellulose, uncharged; CLS-cotton cellulose, postively charged; and WCF-wood cellulose fiber, uncharged) were used as a precoat aid and as a precoat aid plus body feed aid during the pressure leaf filtration of commercial white able wine lots. Samples were taken during filtration and were tested for turbidity and membrane filterability. It was found that the measurement of turbidity was not a good indication of the filterability. Membrane filterability data, recorded as increments of time and volume, were used to develop resistance curves which were analyzed by the exponential filtration model of De La Garza and Boulton . These curves were used to compare the effectiveness of the fibers in improving the membrane filterability through pressure leaf filtration. The positive charge on the CLS, when used as a precoat aid, improved the membrane filterability of the initial filtrate, but the charge was depleted before the completion of the pressure leaf filtration. The addition of CLR or CLS as a body feed aid greatly improved the membrane filterability when compared to use of fiber as a precoat aid only. The best filterability was obtained with CLS in both the precoat and the body feed. Next best was CLS precoat with CLR body feed, and then CLR precoat with CLR body feed, and WCF precoat with WCF body feed. AA

561 COTTRELL (THE) and McLELLAN (MR). The effect of fermentation temperature on chemical and sensory characteristics of wines from seven white

grape cultivars grown in New York State. **Am. J. Enol. Vitic.** 37(3); 1986; 190-94

Seven cv. of white grapes grown in New York (Chardonnay, White Riesling Seyval blanc, Ravat 34, Cayuga White, Horizon, and NYSAES 65,444,4) were fermented at temp. ranging from 8.8 to 25.5° C. The wines were finished following a standard format, bottled, and stored at 13°C. Analyses for normal constituents as well as fusel oils were performed, and variations with fermentation temp. were observed. Sixteen tasters experienced in difference testing were asked to detect differences between wines of the same variety fermented at different temp, In wines where floral character was believed to be the dominant aspect of the wine (Ravat 34 and White Riesling), panelists could detect the difference between wines produced at the highest and lowest temp. Two cv. (Chardonnay and Horizon) evoked little or no difference in response related to the fermentation temp. AA

562 GUINARD (J-K), PANGBORN (RM) and LEWIS (MJ). Preliminary studies on acidity-astringency interactions in model solutions and wines. **J. Sci. Food Agric. 37**(8); 1986; 811-7

The preliminary hypothesis that hydrogen boding is the main reaction involved in the formation of protein-tannin complexes resulting in the sensation of astringency is further confirmed. KAR

563 GUINARD (JX), PANGBORN (RM) and LEWIS (MJ). The time-course of astringency in wine upon repeated ingestion. **Am. J. Enol. Vitic. 37**(3); 1986; 184-9

Using a computerized technique for time-intensity (TI) measurements, the effects of three successive ingestions on the time-course of astringency of 0, 250 and 500 mg/L of tannic acid in white wine were measured by 10 judges. Time intervals of 5 or 30 sec, were programmed between the end of one sample evaluation and the beginning of the next. Upon repeated ingestion, total duration of astringency increased significantly ($p < 0.001$), whereas max. intensity and time to max. intensity did not change. Max. intensity of astringency increased significantly ($p < 0.001$) with concn of added tannic acid. No significant difference was found between the 5- and 30-sec. delays between samples for total duration, max. intensity, and time to max. intensity of astringency. In a second exp. the effects of temporal astringency of three successive ingestions of wine containing 0- and 500 mg/L of tannic acid, served as 8- or 15-mL samples,were measured by eight trained judges. Time intervals of 20 or 40 sec were programmed between ingestions with continuous TI data collection. Max. intensity of astringency and intensity at ingestion increased significantly ($p < 0.001$) upon repeated ingestion and with concn of added tannic acid. Sample size did not affect temporal astringency of wine upon repeated ingestion. Intensity of astringency at ingestion decreased significantly ($p < 0.001$) when time between ingestions was increased from 20 to 40 sec. AA

564 LAZARO (F), CASTRO (MDLde) and VALCARCEL (M). Photometric determination of tartaric acid in wine by flow injection analysis. **Analyst. 111**(7); 1986; 729-32

565 LINDL (T), PELLKOFER (R) and ENGLERT (K). **In vitro** test for toxicity of diethyleneglycol by use of cell culture systems and an automated bacterial test system. **Z. Lebensmittel-Unters Forsch. 183**(1); 1986; 1-7 (De)

Diethyleneglycol (DEG) was tested for its general cytotoxic effects in three cell culture test systems and in a novel, automated bacterial test system. The first cytotoxic effects were detected in the cell culture test systems at DEG-concn of 1 g/l and 3 g/l. The bacterial test system showed a minimal inhibitory concn of 5 g/l DEG

(20% growth reduction). Morphological observations showed evidence of membrane damage to the cultured cells by DEG. With the bacterial test system one could determine the amount of DEG semiquantitatively in wines to which this material had been added. AA

566 RADLER (F) and ZORG (J). Characterization of the enzyme involved in formation of 2-butanol from **meso**-2,3-butanediol by lactic acid bacteria. **Am. J. Enol. Vitic. 37**(3); 1986; 206-10

OILS AND FATS

Groundnut oils

567 SHANTHI NARASIMHAN, RAGHUVEER (KG), ARUMUGHAM (C), BHAT (KK) and SEN (DP). Oxidative rancidity in groundnut oil - evaluation by sensory and chemical indices and their correlation. **J. Food Sci. Technol. (India) 23**(5); 1986; 273-7

Groundnut oil stored at 20-27, 30 and 37°C for 18 wk were tested at alternate wk for peroxide value (PV), Kries value, Anisidine value, sensory odour and flavour along with stored commercial to find out the relationship, if any, between chemical parameters and sensory odour and flavour scores. PV is related to the sensory score to the extent that at PV of 20 "incipient rancidity" is predicted while at PV of 50 the rancidity will be "just noticeable" in odour and flavour; but this is not applicable to samples stored at 37°C. Kries test showed significant relationship with sensory odour and flavour scores of both groundnut oil stored and commercial oil. The regression indicates that a low Kries value can distinctly predict superior quality of oil while a high Kries value will indicate deterioration in quality. KAR

Rice bran oils

568 SEETHARAMAIAH (GS) and PRABHAKAR (JV). Oryzanol content of Indian rice bran oil and its extraction from soap stock. **J. Food Sci. Technol. (India) 23**(5); 1986; 270-73

The oryzanol content of commercial rice bran oil was 1.34-1.95%, hexane extracted oil had 1.12-1.38% and chloroform; methanol (2:1) extracted oil had 2.55-2.61% oryzanol content. The soap stock obtained by alkali refining of the oil contained 1.3-3.1% oryzanol. The optimum pH (levels tested 8.0-10.5) for extraction from soap stock was around 9.5. Diethyl ether was a better solvent than acetone. The oryzanol concn could be upgraded by alumina column chromatography and recrystallized using methanol and methanol-acetone (2:1). The recrystallized material had a m.p. of 133-139 C and absorption max at 314, 290 and 230 nm in petroleum ether. KAR

Sunflower oils

569 MILLER (N), PRETORIUS (HE) and RIET (WB). The effect of storage conditions on mould growth and oil quality of confectionery and high-oil sunflower seeds. **Food Sci. + Technol. 19**(2); 1986; 101-3

Confectionery and high-oil sunflower seeds were stored under favourable condition (25°C; 50% relative humidity (RH) and unfavourable conditions (30°C; 80% RH) for 23 wk. The moisture and free fatty acid (FFA) contents reached higher values in the confectionery type seeds. The correlation between FFA value and total mould count was $r=0.56$; $p < 0.01$ and $r=0.77$; $p < 0.05$ for high-oil and confectionery type respectively. Several mould species were isolated from the stored seed, the predominant ones under unfavourable conditions being **Eurotium amstelodami** and **E. chevalieri**. AA

SPICES AND CONDIMENTS

570 SAVITRI (A), BHAVANISHANKAR (TN) and DESIKACHAR (HSR). Effect of spices on in **vitro** gas production by **Clostridium perfringens. Food Microbiol. 3**(2); 1986; 195-9

The effect of various species on **in vitro** gas formation by **Clostridium perfringens** was tested in Brain Heart Infusion broth using dehusked pigeon pea powder as the main carbohydrate source. Gas formation was totally inhibited by unheated clove (**Eugenia caryophyllus**), cinnamon (**Cinnamomum zeylaricum**), garlic (**Allium sativum**) and autoclaved clove. Ginger **Zingiber officinale**), pepper (**Piper nigrum**) and turmeric (**Curcuma longa**) had some inhibitory effect on gas formation, but autoclaving reduced inhibition by ginger and turmeric. Min. inhibitory concn. for gas production were 0.3, 0.5 and 1% for autoclaved clove, unheated clove and cinnamon, and unheated garlic, respectively. Inhibition of gas formation was due to inhibition of the bacterial growth except in case of garlic where some change in the metabolic pathway may be involved. AA

Juniper

571 GINESTA (E), PRIMO (J) and CUNAT (P). Ovicidal active compounds from **Juniperus thurifera** L. **Rev. Agroquim. Tecnol. Aliment. 26**(2); 1986); 304-7 (Es)

The dichloromethane extract of **Juniperus thurifera** has shown a strong ovicidal activity against **Leptinotarsa decemlineata.** The fraction eluted with dichloromethane/acetone (90:10) on a silica gel column, was found to show significant ovicide activity. Three compounds were isolated from this fraction by HPLC: podophyllotoxone (I), desoxypodophyllotoxin (II) and 3-(3',4'-dimetoxy) phenyl-2-propen-1-ol (III). II cause the death of 100% of the eggs at 1 µg/µl: I and III show activity at 10 µg/µl. AA

Marjoram

572 NYKANEN (I). High resolution gas chromatographic-mass spectrometric determination of the flavour composition of wild marjoram (**Origanum vulgare** L.) cultivated in Finland. **Z. Lebensmittel-Unters. Forsch. 183**(4); 1986; 267-72

A total of 82 compounds were identified, of which 37 were components whose occurrence in **O. vulgare** has not been reported before. Among the compounds identified 40 were hydrocarbons, 20 alcohols, seven carbonyl compounds, three phenols, and two phenol ethers. The wild marjoram samples could be divided into three types on the basis of the composition of the oil. Germacrene D was the main component in the hydrocarbon type, and carvacrol in the phenol type. The intermediate type contained equal amounts of both germacrene D and carvacrol. The herb in flower gave a higher yield of the oil than did the herb in bud. The effects of growth location and cultivation in open field vs. under cover on the yield and composition of the oil were obscured by the mixing of the chemotypes. AA

Pepper

573 GEORGE (KM), CHANDRAN (CV), JOY (MT), THOMAS MATHULLA and VERGHESE (J). Focus on pepper technology. II. Black pepper oleoresin manufacture and utilisation. Part I: On the choice of spice substrate. **Indian Spices. 22**(4) & **23**(1/2); 1985-1986, 17-22

Various tests like sp. gr. wt., of pepper, maturity, storage of the pepper have been tested to find out the yield of oleoresin from pepper. These aspects have been reviewed. (See for Part I. Indian Spices. 22(3); 1985; 27, 29). KAR

SENSORY EVALUATION

574 MATSUMOTO (S). W/0/W-type multiple emulsions with a view to possible food applications. **J. Texture. Stud. 17**(2); 1986; 141-59

Fundamental aspects of this type of emulsions are considered to obtain an insight into factors affecting its formation and stability including functional properties of the oil layer on the surface of aqueous compartments. MVG

575 MITA (T). Rheological and structural analysis of dispersion of foodstuffs. **J. Texture Stud. 17**(2); 1986; 113-9

After reviewing the familiar theories of linear viscoelasticity, the theory of flow as a cooperative phenomenon is considered and its application to foodstuffs discussed. MVG

576 NODA (M) and SHIINOKI (Y). Microstructure and rheological behaviour of whipping cream. **J. Texture stud. 17**(2); 1986; 189-204

The mechanism of the formation of a rigid foam structure during whipping of reconstituted whipping cream was investigated. The rheological properties of whipped cream were estimated from an analysis of shear creep curves by a four element model. The values of each element increased exponentially during the process of whipping. From cryo-SEM observation, the surface of air bubbles consisted of a thin membrane which was penetrated by fat globules. Also, fat globules in the serum were joined together by free fat to form a framework structure. The relationship between the rheological properties and microstructure of whipped cream was deduced from the rheological properties of two model systems. It is believed that whipped cream is a mixed matrix of a soft O/W structure and stiffer W/O structure. AA

577 O'MAHONY (M), WONG (SY) and ODBERT (N). Sensory difference tests; Some rethinking concerning the general rule that more sensitive tests use fewer stimuli. **Food Sci. + Technol. 19**(2); 1986; 93-4

The dual standard and duo-trio procedures for sensory difference testing were compared, using a model system and a lemonade food system. The dual standard was more sensitive to differences, in both cases. The results highlights the inadequacy of a simple rule for predicting test sensitivity based on mere stimulus numbers. It highlights the complex role of adaptation as well as the possible involvement of cognitive factors. AA

578 SHIINOKI (Y) and YANO (T). Rheological properties of dispersed two-phase systems. **J. Texture Stud. 17**(2); 1986; 175-88

The newly developed computation technique, finite Element Method to solve the problem of structure dependence of the physical properties of dispersed systems has been discussed. MVG

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

579 MURALIDHARA, KRISHNAKUMARI (MK) and MAJUMDER (SK). Effect of low dietary protein on the mammalian toxicity of technical X-factor. **J. Food Sci. Technol. (India) 23**(5); 1986; 281-6

The toxicity of technical X-factor (a by-product obtained during the separation of lindane from technical benzene hexachloride) in female rats fed low protein (LP) (7% protein) and normo protein (NP) (17% protein) diet for 45 days was investigated. In acute study LP rats were fed 0.4, 0.6, 0.89 and 1.33 g of X-factor/kg body wt. and NP rats were fed 2, 3, 4 and 6.75 g of X-factor/kg body wt. In subacute study, male weanling rats were fed X-factor at 25 and 1500 p.p.m. in LP and NP diet for 90 days. Typical signs of central nervous system poisoning occurred in LP and NP fed groups within 24 h, predominant symptoms were initial dullness, lactimation, incoordination of hind limbs, paralysis and convulsions preceding death. In LP fed rats the toxicity increased by 7-fold compared to NP fed rats. In subacute study, feeding of LP diet for 90 days retarded rat growth by 50% compared to NP. At 1500 p.p.m. of X-factor LP groups developed signs of X-factor poisoning and mortality suggesting that high protein dietary renders protection to rats from X-factor toxicity. While a high degree of hepatic hypertrophy and marked testicular atrophy were evident in LP group rats at 1500 p.p.m., significant changes in the levels of serum and liver enzymes (transaminases and glucose-6-phosphatase) were observed among LP and NP groups. KAR

BIOCHEMISTRY AND NUTRITION

580 ANSHER (SS), DOLAN (P) and BUEDING (E). Biochemical effects of dithiolthiones. **Food Chem. Toxicol. 24**(5); 1986; 405-15

581 KNORR (D). Nutritional quality, food processing, and biotechnology aspects of chitin and chitosan: A review. **Process Biochem. 21**(3); 1986; 90-92

This review covers nutritional apsects of chitin/chitosan; use of chitinuous polymers in food processing and food biotechnology; application as dietary fibre, functional ingredients and processing aids. BV

582 NEY (KH). Common salt and its substitutes as carriers. **Gordian. 86**(3); 1986; 47 (De)

Common salt is used in large amounts as a carrier for iodide, fluoride, and iron, which are administered for the prevention of goitre, caries, and anaemia. The food industry also uses sodium chloride as a carrier for nitrite and flavours. In all these applications, common salt should be replaced by potassium chloride, in order to reduce sodium intake. KMD

583 PAULUS (K). Quality of dietetic food: Significance for human nutrition. **Food Sci. + Technol. 19**(2); 1986; 147-51

Dietetic foods suffer from the effects of treatment and processing in the same way as the usual food products. This fact is of particular significance in those dietetic food categories in which the composition is precisely defined. A further complication is that changes in properties and quality parameters occurring in dietetic foods must be in a different way from the changes occurring in usual foods. KMD

TISSUE CULTURE

Nil

TOXICOLOGY AND HYGIENE

584 QUINTAVALLA (S). The sterigmatocystins. **Ind. Conserve.** 61(1); 1986; 34-41 (It)

The main characteristics of sterigmatocystins are described with special reference to the physicochemical and toxicological properties and the biosynthesis pathways. In addition, physicochemical methods for determining these mycotoxins in several contaminated substrates are briefly dealt with. AA

585 SLADE (PJ), FALAH (MA) and AL-GHADY (AMR). Isolation of **Aeromonas hydrophila** from bottled waters and domestic water supplies in Saudi Arabia. **J. Food Prot.** 49(6); 1986; 471-6

586 EL-GAZZAR (FE), RUSUL (G) and MARTH (EH). Growth and aflatoxin production by **Aspergillus parasiticus** in the presence of sodium chloride. **J. Food Prot.** 49(6); 1986; 461-6

Twenty-five milliliters of glucose-yeast-salt medium containing 0, 2, 4, 6, 8 or 10% NaCl was inoculated to contain, approx. 105 or 107 conidia of **Aspergillus parasiticus** NRRL 2999 and then incubated at 13 or 28° C. Amounts of aflatoxin produced were determined using Reversed-Phase High Performance Liquid Chromatography (HPLC). Increasing the concn. of NaCl reduced accumulation of aflatoxin and also induced a lag, in growth of the culture. At 13°C, the mold produced small amounts of aflatoxin after an extended lag phase, and NaCl was markedly more inhibitory at 13 than at 28°C. AA

587 SANCHIS (V), SALA (N), PALOMES (A), SANTAMARINA (P) and BURDASPAL (PA). Occurrence of aflatoxin and aflatoxigenic molds in foods and feed in Spain. **J. Food Prot.** 49(6); 1986; 445-8, 454

588 YOKOSAWA (N), TSUZUKI (K), SYUTO (B) and OGUMA (K). Activation of **Clostridium botulinum** type E toxin purified by two different procedures. **J. Gen. Mikrobiol.** 132(7); 1986; 1981-8

589 ZOTTOLA (EA) and SMITH (LB). Survival of salmonellae in refrigerated, agitated water and water/glycol mixtures. **J. Food Prot.** 49(6); 1986; 467-70

590 JARVIS (BB), LEE (Y.-W), COMEZOGLU (SN) and YATAWARA (CS). Trichothecenes produced by **Stachybotrys atra** from Eastern Europe. **Appl. Environ. Microbiol.** 51(5); 1986; 915-8

Toxin production of 17 isolates (from various parts of Hungary and Czechoslovakia) of **Stachybotrys atra** grown on rice was analysed for each isolate by HPLC. Of the 17 isolates 14 produced macrocyclic trichothecens (satratoxins F, G and -11, roridin E and verucarin J), and trichoverrols A and B. Sacratoxins G and H were produced in higher quantities than trichothecenes. The yield in mg of the above toxins produced by one isolate on 800 g of rice was as follows: roridin E, 12; satratoxin F, 10; satratoxin H, 100; trichoverrol A, 15; and trichoverrol B, 30. MVG

591 LANCETTE (GA). Current resuscitation methods for recovery of stressed **Staphylococcus aureus** cells from foods. **J. Food Prot.** 49(6); 1986;

477-81

Methods and media used to recover stressed and unstressed **Staphylococcus aureus** cells from foods are reviewed. Most probable number methods using Trypticase soy broth with 10% salt and 1% sodium pyruvate, a liquid modification of Baird-Parker agar and Giohitti and Cantoni's broth with Tween are discussed. Direct plating media reviewed are Baird-Parker agar, modified Vogel and Johnson agar, egg yolk-free Baird-Parker agar and single-step **Staphylococcus** selective agar. AA

592 COMI (G), D'AUBERT (S) and CANTONI (C). Streptococcus D in some foods. **Ind. Aliment.** 25(4); 1986; 289-90 (It)

An investigation on **Streptococcus** D presents in some foods has been effected. No one strain is enterotoxigenic. AA

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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm, cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter; Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal, kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg, ml, mm)
m-equiv	milli-equivalent
m	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano- (10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp., spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
μ	micro- (as in μg, μm)
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

GENERAL

593 HOPPNER (K) and LAMPI (B). Total folacin levels in some fast food meals. **Can. Inst. Food Sci. Technol. J.** 19(4), 1986, 195-6

594 PESCHE (D). Penetration of "Productique" in the agro-fooo industries. **Ind. Aliment. Agric.** 103(4); 1986; 211-6 (Fr)

"Productique is a new French word that is used for the study of automation and its applications to portions of the industrial production process. In the food industries, the raw materials are likely to be of highly variable quality, and the finished products also have to satisfy a wide range of tastes among the consumers. Thus, the "productique" art in the food industries must combine economic data on agricultural production, technology of automation and robots, and quick analysis and sensory testing of the semi-finished or finished products. KMD

FOOD PROCESSING AND PACKAGING

Packaging

595 DEMERTZIS (PG) and KONTOMINAS (MG). Interaction of vinyl chloride with polyvinyl chloride) by inverse gas chromatography: Effect of monomer concentration, plasticizer content and temperature. **Z. Lebensmittel Unters Forsch.** 183(2), 1986, 123-7

596 McGINNIS (DS). Prediction of transient conduction heat transfer in foods packaged in flexible retort pouches. **Can. Inst. Food Sci. Technol. J.** 19(4), 1986, 148-57

597 SCHWOPE (AS), TILL (DE), EHNTHOLT (DJ), SIDMAN (KA) and WHELAN (RH). Migration of an organo-tin stabilizer from polyvinyl chloride film to food and foods simulating liquids. **Dtsch. Lebensmittel Rundsch.** 82(9); 1986; 277-82

The migration of the organo-tin stabilizer di(n-octyl) tin S,S-bis (isooctylmercaptoacetate) from polyvinyl chloride (PVC) to foods and food simulating liquids (FSL) was measured. The stabilizer was radiolabeled and blended to an initial concn. of about 1.8 wt. per cent. The FSL studied were water, 3% acetic acid, 100, 50 and 8% ethanol, corn oil and n-heptane. The temp. was 49 C Foods included milk, cola, wine whiskey margarine, mayonnaise, and cheese. Except for the semisolid foods, migration was continuous with no indication of cessation and was approximated by $A._t^n$ where A is a constant and n varied from 0.2 to 0.6. Ethanol and n-neptane were aggressive extractants, while water and 3% acetic acid removed only small amounts of the stabilizer. Migration to semisolid foods was independent of test time. The possibility of decomposition of the stabilizer on the RVC surface and in the external phase is discussed. AA

598 SHARMA (BM). Aluminium packaging in India. **Perfectpac.** 26(3), 1986, 5-6

FOOD ENGINEERING AND EQUIPMENT

599 ANON. Food conveyor belts: Legal provisions and control of migration levels. Ind. Aliment. 24(10); 1985; 788-90, 798 (It)

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

600 EKSTROM (L.-G) and KUIVINEN (J). Spectrophotometric determination of L-pyroglutamic acid as indicator of decomposition or abuse of processed foods. **J. Assoc. Off. Anal. Chem.** 69(4); 1986; 633-6

An analytical procedure is described for determination of L-pyroglutamic acid in molasses, wastewater, and catsup. In the cleanup procedure, proteins in the matrix are precipitated with ethanol and, after acidification, amino acids are retained on a cationic exchanger. The lactam-binding in the pyroglutamic acid ring is quantitatively cleaved by acid hydrolysis to glutamic acid, which is determined spectrophotometrically with an enzymatic method. A commercial test kit is available for performing the latter. Levels of 0.01 mg pyroglutamic acid/mL. can be quantitatively determined. This method requires only basic laboratory equipment and is therefore suitable for laboratories with limited resources. AA

601 FISCHER (PWF), L'ABBE (MR) and GIROUX (A). Colorimetric determination of total iodine in foods by iodide-catalyzed reduction of Ce^{+}_{4}. **J. Assoc. Off. Anal. Chem.** 69(4); 1986; 687-9

602 FISHMAN (MJ), PERRYMAN (GR), SCHRODER (LJ) and MATTHEWS (EW). Determination of trace metals in low ionic strength waters using zeeman and deuterium background correction for graphite furnace atomic absorption spectrometry. **J. Assoc. Off. Anal. Chem.** 69(4); 1986; 704-8

603 KERHARDT (U) and TONHAUSER (H). The practical application of the filth test. **Gordian** 86(6); 1986; 113-7(De)

The purpose of the authors was to select from the known methods for the measurement of "filth" (i.e. impurities of animal origin) those which are the most practicable - i.e. simple, rapid, and certain. Flotation methods are the ones most commonly used, and a detailed description is given of the application of the A.O.A.C. flotation method. Results of tests on 60 different spices have been reported in a table. KMD

604 HARLAND (BF) and OBERLEAS (D). Anion-exchange method for determination of phytate in foods: Collaborative study. **J. Assoc. Off. Anal. Chem.** 69(4); 1986; 667-70

605 ROTHMAN (AM). Liquid chromatographic determination of dicofol in melthane formulations: Collaborative study. **J. Assoc. Off. Anal. Chem.** 69(4); 1986; 714-20

606 TOMKINS (DF). Gas chromatographic determination of butachlor in formulations: Collaborative study. **J. Assoc. Off. Anal. Chem.** 69(4); 1986; 721-3

607 TOMKINS (DF). Gas chromatographic determination of propachlor in pesticide formulations: Collaborative study. **J. Assoc. Off. Anal. Chem.** 69(4); 1986; 723-5

FOOD LAWS AND REGULATIONS

608 DILLY (P). The new "Potable Water Ordinance". **Gordian** 86(6); 1986; 108-10 (De)

A new "potable water ordinance" was issued in West Germany on 14.3.1986. Several of its provisions have been summarized and explained. KMD

FOOD MICROBIOLOGY

609 ENTIS (P). Hydrophobic grid membrane filter method for aerobic plate count in foods: Collaborative study. **J. Assoc. Off. Anal. Chem.** 69(4); 1986; 671-6

610 HASINOFF (BB). A first-derivative method for the analysis of Michaelis enzyme progress curves. **Can. Inst. Food Sci. Technol. J.** 19(4), 1986, 181-5

611 JARVIS (AW) and KLAENHAMMER (TR). Bacteriophage resistance conferred on lactic streptococci by the conjugative plasmid PTR2030: Effects on small isometric-, large isometric-, and prolate-headed phages. **Appl. Environ. Microbiol.** 51(6), 1986, 1272-7

612 VALLETRISCO (M) and NIOLA (I). Biocatalysts as a possible solution to the problem of residues in foodstuffs. **Ind. Aliment.** 25(6), 1986, 455-7

The paper emphasizes the increasing importance of enzymes in food technologies, now that industries are interested in a lot of innovating processes, like biotechnologies, and consumers are looking for foodstuffs which are free (if possible) from unwanted residues. AA

Algae

613 ABD EL-MAGID (MM) and ANUSUYA (M). The effect of incorporation of **Spirulina** in high fat synthetic diets on certain serum liver enzymes in rats.ty **Egypt. J. Food Sci.** 14(91); 1986; 59-66

The effect of incorporation of **Spirulina platensis** in high fat diets on liver and serum cholesterol levels and serum enzymes was investigated in albino rats. Rats were given high fat diet for a period of 21 days followed by the experimental diets containing algae 100 mg and 250 mg/rat/day for a period of 35 days. One group of rats was used as control I (fed with basal diet), the other group used as control 1 (fed with high fat diet) for a period of 56 days. Basal diet was used for comparison. Upon feeding diets containing algae the activity of the hepatic enzymes like alanine amino transferase and alkaline phosphatase increased. The activity was more pronounced in rats fed with high amounts of algae. There was marginal increase in the serum protein levels of rats fed with algae. Significant differences were not noticed in the serum and liver cholesterol levels. AA

614 ABD EL-MAGID (MM). Effect of some pesticides on the growth of blue-green alga **Spirulina platensis**. **Egypt. J. Food Sci.** 14(1); 1986; 67-74

The effect of eleven peticides on the growth of blue green alga

Spirulina platensis in indoor cultures has been studied. There was a dose-dependent growth inhibition of this alga as a result of pesticide exposure at a dose level ranged from 0.5 to 25 p.p.m.. Copper sulphate was the most toxic at all levels being tested. Sevin and Sumithion inhibited growth at 5 p.p.m. and γ-BHC at 10 p.p.m. on fifth day. A marked retardation of growth was observed with Pirimiphosmethyl at 10 p.p.m. and Malathion at 20 p.p.m.. **Spirulina** showed tolerance to 25 p.p.m. of Bromophos and Heptachlor and to certain extent β-BHC and DDT. As the inputs for **Spirulina** culturing and maintenance are simple, economical, and rapid, this alge could **have** a probable diagnostic value as an indicator of pesticide pollution in water. AA

615 BECKER (EW), JAKOBER (B), LUFT (D) and SCHMULLING (RM). Clinical and biochemical evaluations of the alga **Spirulina** with regard to its application in the treatment of obesity. A double-blind cross-over study. **Nutr. Rep. Int. 33(4)**, 1986, 565-74

In a double-blind cross-over study **vs** placebo a supplemental dietary intake of 2.8 g of **Spirulina** thrice a day over a period of 4 wk showed a small but statistically significant reduction of body wt. in obese outpatients. Adverse effects on clinical variables (blood pressure, heart rate) or biochemical variables (screening program including 32 parameters) were not detectable; relevant side effects were not observed. AA

Bacillus

616 GURLER (B). Production of α-amylase by the fermentation technique. I. Selection of bacterial strains and optimization of bacterial culture medium. **Getreide Mehl Brot.** 40(7), 1986, 204-8 (De)

Various German strains of **B. subtilis** and **B. amyloliquefaciens** were grown on different types of media to study their production of -amylase. The culture medium that was found to be optimal contained: saccharose, NH_4NO_3 and a mixture of Ca, Mn, and Zn salts. KMD

Mushrooms

617 BURTON (KS). Quality-investigations into mushroom browning. **Mushroom J. No. 158**, 1986, 68-70

618 FRIEDERICH (U), FISCHER (B), LUTHY (J), HANN (D), SCHLATTER (C) and WURGLER (FE). The mutagenic activity of **agaritine** - a constituent of the cultivated mushroom **Agaricus bisporus**-and its derivatives detected with the salmonella/mammalian microsome assay (ames test). **Z. Lebensmittel Unters Forsch** 183(2), 1986, 85-9

Purified agaritine (N′-(γ-L(+)-glutamyl)-p-hydroxy- methylphenylhydrazine) isolated from **Agaricus bisporus**, p-hydrazinobenzoic acid (its presumptive precursor) and some agaritine-degradation products were tested for mutagenic activity with the Salmonella/mammalian microsome assay (Ames test), Consistent with the literature, agaritine showed a distinct direct-acting mutagenicity with the strain TA1537 (30 revertants/μmol) and with TA97. The hypothetical ultimate mutagenic metabolite of agaritine, the **p-hydroxymethyl**- benzenediazonium ion, a compound occuring naturally in **A. bisporus**, showed the highest mutagenic activity (with TA1537 approx. 300 to 1000 revertants/μmol). AA

619 HADAR (Y) and COHEN-ARAZI (E). Chemical composition of the edible mushroom Pleurotus ostreatus produced by fermentation. **Applied Environ. Microbiol.** 51(6), 1986, 1352-4

Pleurotus ostreatus 'Florida' was grown in submerged liquid culture. The biomass yield of the fungus, grown for 3 days in 2-liter fermentors, where the mycelial pellets measuring 5 mm in diam. were formed, was 11.7 g (dry wt.) l. Comparing the chemical constituents of fruiting bodies produced on cotton straw and mycelial pellets revealed **several** similarities in total nitrogen, protein, glycogen, fatty acids, RNA, and ash content. Differences were observed in the contents of six amino acids. Although the total fatty acid content was similar, there were more saturated fatty acids in the mycelium. Cell wall composition, typical for basidiomycetes, was observed in both mycelium and fruiting bodies. With laminarin as the main polymer. AA

620 MUTANEN (M). Bioavailability of selenium in mushrooms, **Boletus edulis** to young women. **Int. J. Vit. Nutr. Res. 56**(3), 1986, 297-301

The bioavailability of selenium (Se) in mushrooms, **Boletus edulis** to young Finnish women was studied by giving them 150 µg Se as mushrooms for 4 wk. The indicators of body status were plasma and erythrocyte Se levels and plasma and platelet glutathione peroxidase (GSH-Px) activity. The Se level in erythrocytes increased significantly (26%), while only slight enhancement were found in plasma Se and plasma or platelet GSH-Px activity. The results indicate that the metabolism of mushroom-Se is different from that of wheat-Se or sodium selenate. However, by the criteria of plasma Se level or plasma and platelet GSH-Px activity the bioavailability of mushroóm-Se is reasonably low. AA

Rhizopus delemar

621 MOHSEN (SM), ALIAN (AM), ATTIA (R) and El-AZHARY (T). Purification of **Rhizopus delemar** lipase. **Egypt J. Food Sci. 14**(1); 1986; 147-56

In the present study **Rhizopus delemar** lipase was purified by using different methods. It was found that precipitation of lipase at 0.7 saturation of ammonium sulphate gave the highest yield of enzyme and the pH during precipitation had a great effect on specific activity, yield and degree of purification. The precipitation of lipase by using acetone, methanol or isopropanol was studied. The purification pattern of lipase showed that the degree of purification reached 79.8 folds by using ammonium sulphate followed by Sephadex G 25 and G 75. The average mol. wt of the purified lipase was found to be 48,720. AA

Yeasts

622 FUKAL (L), KAS (J) and RAUCH (P). Properties of yeast proteinases. **J. Inst. Brew. 92**(4), 1986, 357-9

FOOD ADDITIVES

Curcumin

623 TONNESEN (HH), KARLSEN (J) and HENEGOUWEN (G). Studies on curcumin and curcuminoids. VIII. Photochemical stability of curcumin. **Z. Lebensmittel Unters Forsch 183**(2), 1986, 116-22

The photodecomposition of curcumin when exposed to UV/visible radiation is studied. The main degradation products are identified. The reaction mechanisms are investigated and the order of the over all degradation reactions and the half-lives of curcumin in different solvents and in the solid state are determined. AA

CEREALS

Barley

624 MacGREGOR (AW) and MARCHYLO (BA). α-amylase components in excised, incubated barley embroys. **J. Inst. Brew.** 92(2); 1986; 159-61

625 SELVIG (A), AARNES (H) and LIE (AS). Cell wall degradation in endosperm of barley during germination. **J. Inst. Brew.** 92(2); 1986; 185-7

Buckwheat

626 MAZZA (G). Buckwheat browning and colour assessment. **Cereal Chem.** 63(4); 1986; 361-4

627 MITSUNAGA (T), MATSUDA (M), SHIMIZU (M) and IWASHIMA (A). Isolation and properties of a thiamine-binding protein from buckwheat seed. **Cereal chem.** 63(4); 1986; 332-5

Rice

628 DHALIWAL (YS), NAGI (HPS), SIDHU (GS) and SEKHON (KS). Physicochemical, milling and cooking quality of rice as affected by sowing and transplanting dates. **J. Sci. Food. Agric.** 37(9), 1986, 881-7

Sowing and transplanting dates affected the head rice yield and brokens. Grain dimension and thousand kernel wt. of paddy and rice were affected by the dates of sowing. Protein content of rice was not affected by sowing dates but late transplantings resulted in higher values. Free fatty acids in rice and bran were significantly increased with late sowing and transplanting dates, however, the amylose content decreased under these conditions. Late transplanting dates decreased the min. cooking time but increased the solid losses in gruel. The late transplantings deteriorated the organoleptic properties of cooked rice and higher values for clearing and spreading.
KAR

629 NAEWBANIJ (M), SEIB (PA), CHUNG (DS), SEITZ (LM) and DEYOE (CW). Ergosterol versus dry matter loss as quality indicator for high-moisture rough rice during holding. **Cereal Chem.** 63(4); 1986 315-20

Two var. of long-grain and one var. of medium-grain rough rice were mechanically harvested, sun-dried, and rewetted for holding experiments. Small samples (∼0.25 kg of the three var. were aerated slowly while held at four temp. (18.3, 23.9, 29.4 and 35°C) and three moistures (16, 18 and 20%). Dry-matter loss (DML), ergosterol, and damaged kernels were determined with increased holding time. Ergosterol in the rough rice correlated well (r =0.96) with damaged kernels in the milled rice. Rice grade dropped from U.S. No.1 (damaged kernels $\leqslant$ 0.5%) to below U.S. No. 2 (damaged kernels $\geqslant$ 1.5%) as the ergosterol level increased more than 1 ug/g above its initial value. Rough rice DML correlated poorly (r = 0.62 - 0.63) with percent damaged kernels, and the resulting grade could not be predicted by DML. An empirical equation was developed to express ergosterol in high-moisture rough rice as a function of moisture content, temp. and time. Ergosterol increase during the predrying holding period appeared to be a better indicator of quality loss in high moisture grain than DML.
AA

630 SHARP (RN). A rapid procedure for determining amylographic viscosity of rice flour. **Cereal Chem.** 63(4); 1986; 325-6

An amylographic viscosity profile was produced within 10 min.

from 13% rice flour slurry (15 g of rice flour [12.5% wb] in 100 ml of water) and used to predict the standard amylographic peak viscosity. A high degree of linear relationship was found between the rapid and standard peak viscosities of medium-grain rice flour and between an adjusted rapid peak and standard peak viscosities of long-grain rice flour. Predictive equations were developed for both medium and long grain rice. AA

631 UMA REDDY (M) and PUSHPAMMA (P). Effect of storage on amino acid and biological quality of protein in different var. of rice and sorghum. **Nut. Rep. Int. 33**(5), 1986, 753-9

The effect of storage of rice and sorghum for a period of 12 months (with and without insect infestation) on the biological quality of protein and lysine, methionine and tryptophan content has been studied. The results showed that the decrease in protein quality and the above amino acids content in rice was low (about 10%). On the other hand, the decrease in protein quality and the amino acids in sorghum was high (30-50%). Insect infestation of these food grains during storage caused further decrease in the protein quality and lysine, methionine and tryptophan content. AA

632 WADSWORTH (JI) and KOLTUN (SP). Physicochemical properties and cooking quality of microwave-dried rice. **Cereal Chem. 63**(4); 1986; 346-8

Starbonnet and Labelle varieties of long-grain rice and Nato var. of medium-grain rice were dried under vacuum with microwave energy to determine the effects of microwave-vacuum (MV) treatments on the physicochemical properties and eating characteristics of the milled rice. Milled rice was evaluated by alkali reaction, water-uptake capacity, amylographic gelatinization and pasting characteristics, and taste panel. There were no significant differences between the air-dried controls and the MV treatments for both peak viscosity and setback viscosity. The alkali-spreading values and water-uptake capacities for some of the MV-treated samples were statistically slightly greater than the control samples; however, the differences were not great enough to be of any practical consequence. The taste panel could not distinguish between MV-treated samples and the control. MV techniques can be used to dry rice without materially altering the cooking and eating characteristics. AA

Rye

633 MEUSER (F), SUCKOW (P) and ABDEL-GAWAD (A). Chemical and physical characterization of rye pentosans. **Getrieide Mehl Brot 40**(7), 1986, 198-204

The pentosan fractions obtained from 2 var. of rye grown in two seasons (1981 and 1982) were analysed for their sugar composition as well as mol. wt. distributions. No differences could be observed between the 2 var. in the two seasons. As variations of the extraction procedure also did not produce any differences, the pentosan fractions must be regarded as being identical. All insoluble pentosan fractions obtained from rye contained galactose, in striking contrast to wheat pentosans. Other properties of the pentosan fractions of rye have been described in detail, and contrasted with those of the wheat pentosans. KMD

Wheat

634 APPELT (G). Nutritive value and stability of extruded products from wheat germs. **Getreide Mehl Brot 40**(6); 1986; 176-80 (De)

The nutritive value and stability of the known wheat-germ specialities - prepared by the Biogerm (or BRM) system - have been compared with those of new products prepared by HTST extrusion. The stability of wheat germ extrudates made from raw wheat germ has been compared with that of extrudates made from Biogerm wheat germ. The max. possible proportion of wheat germ in extruded products has been determined. The sorption behaviour of extrudates has also been studied. Finally, examples are given of applications that have proved to be successful. KMD

635 BEKES (F), ZAWISTOWSKA (U), ZILLMAN (RR) and BUSHUK (W). Relationship between lipid content and composition and loaf volume of twenty-six common spring wheats. **Cereal Chem. 63**(4); 1986; 327-31

Lipid data for flours of 26 common spring wheats were obtained and analysed statistically for possible relationships with loaf volume. Lipid data for whole grain meals of var. grown in three regions were also obtained and compared with flour data and statistically correlated with loaf volume. MVG

636 BELITZ (H-D), KIEFFER (R), SEILMEIER (W) and WIESER (H). Structure and function of gluten proteins. **Cereal Chem. 63**(4); 1986; 336-41

637 FARAG (RS), MOHSEN (SM), KHALIL (FA) and BASYONY (AE). Effect of certain fungi on the lipids of wheat kernels, sesame and soybean seeds. **Egypt. J. Food Sci. 14**(1); 1986; 131-45

Physical and chemical properties of the oils extracted from healthy and infected seeds rich in carbohydrates (wheat), proteins (soybean) and oil (sesame) were studied. The results showed a decrease in refractive index and iodine value and an increase in acid value in infected oil. The fungal infection caused qualitative and quantitative differences in the free and bound fatty acids of the seeds in this study. Fungal infection loed to the appearance of some new fatty acids and disappearance of some medium chain-length fatty acids. AA

638 GREENWELL (P) and SCHOFIELD (JD). A starch granule protein associated with endosperm softness in wheat. **Cereal Chem. 63**(4); 1986; 379-80

639 KREY (B) and RUCKENBAUER (P). Collaborative investigations for the determination of sprout damage in durum wheat. **Getreide Mehl Brot 40**(6); 1986; 163-6 (De)

640 MacRITCHIE (F) and WRIGLEY (CW). Lipid composition of flour and quality changes associated with sulphur deficiency in wheat. **Cereal Chem. 63**(4); 1986; 378

641 WARE (GM), CARMAN (AS), FRANCIS (OJ) and KUAN (SS). Liquid chromatographic determination of ergot alkaloids in wheat. **J. Assoc. Off. Anal. Chem. 9**(4); 1986; 697-9

642 MASSON (MT), VILLANOVE (F) and GREAVES (P). Histological demonstration of wheat germ lectin binding sites in the liver of normal and ANIT treated rats. **Arch. Toxicol. 59**(2), 1986, 121-3

Wheat-germ lectin peroxidase conjugate was used to stain the liver of normal rats and rats given α-naphthylisothiocyanate (ANIT). Changes in patterns in bile duct and canalicular staining were compatible with the hypothesis that cell damage caused by ANIT is essentially restricted to bile ducts. AA

643 SCHRADER-OLMS (B), SEIBEL (W), and PFEILSTICKER (K). Analytical, dough-rheological, and baking studies for optimization of the wheat flour baking test. Part 3. Practical use of the optimized Rapid-Mix-Test (wheat cultivars and wheat mixtures). **Getreide Mehl. Brot. 40**(6); 1986; 166-71 (De)

168 samples of durum wheat were tested by two methods: viz., the

standardized α-amylase analyzer-system and the 7g/9g fall index method. The results were compared, in respect of regression functions, confidence intervals, and correlation coeff. and found to be in good agreement. Advantages and disadvantages of the tests - with reference to sample size, time needed to conduct test, reproducibility, and costs - have been discussed. KMD

644 SCUDAMORE (KA), ATKIN (PM) and BUCKLE (AE). Natural occurrence of the naphthoquinone mycotoxins, xanthomegnin, viomellein and vioxanthin in cereals and animal feedstuffs. **J. Stored Prod. Res. 22**(2), 1986, 81-4

The occurrence of xanthomegnin, viomellein and vioxanthin in commercial samples of wheat and oil seed rape, and of xanthomegnin and vioxanthin in barley, is reported for the first time. Analytical methodology for detection and confirmation of these compounds is described. AA

645 SEIBEL (W) and SEILER (K). Addition of extruded wheat flours in the production of yeast-raised products with 10-40% added fat (based on flour). **Getreide Mehl. Brot. 40**(6); 1986; 172-5. (De)

The water-uptake of wheat flours can be increased by means of hot extrusion. Various Christmas breads and cakes have been made with flours containing 2.5, 5.0, and 10.0% of hot-extruded flour; the admixture of hot-extruded flour increased the dough yield. The best baking results were obtained with extrudates processed at 114° C and 24% moisture in raw material. However, the quality improvements obtained by this rather expensive treatment (i.e. hot extrusion) is negligible compared with the quality of yeast-raised products. KMD

646 SEGUCHI (M). Lipid binding by protein films heated on glass beads and prime wheat starch. **Cereal Chem. 63**(4); 1986; 311-5

Heat treatment of glass powder or glass beads coated with bovine serum albumin (BSA) imparted strong oil-binding ability similar to that of heat treated wheat starch. Heat-treated BSA alone showed strong oil-binding capacity (3.4-3.6 ml oil/g BSA) and almost no solubility in water. Other proteins (ovalbumin, casein, gluten, and soybean protein) also exhibited oil-binding ability after heat treatment, but polysaccharides (soluble starch, konjac glucomannan, cyclodextrin, Sephadex G-50 and pectin) did not. Paper chromatography of 20 amino acids indicated that there was no change in amino acids after heat treatment. No differences were observed in the infrared spectroscopy and X-ray diffraction patterns of nonheated and heated BSA. Heated BSA showed far lower susceptibility to pepsin digestion than nonheated BSA, which would suggest the occurrence of conformational changes in BSA by heat treatment. AA

647 SKERRITT (JH). Molecular comparison of alcohol-soluble wheat and buck wheat proteins. **Cereal Chem. 63**(4); 1986; 365-9

648 WARE (GM), CARMAN (AS), FRANCIS (OJ) and KUAN (SS). Liquid chromatographic determination of ergot alkaloids in wheat. **J. Assoc. Off. Anal. Chem. 69**(4); 1986; 697-9

649 WEIPERT (D) and POMERANZ (Y). Viscometric indexes of U.S. wheats and flours of widely different protein contents and breadmaking quality. **Cereal Chem. 63**(4); 1986; 352-7

Whole grain meals and flours milled from six U.S. hard red winter wheat var. or selections from five crop years were evaluated for breadmaking properties. The wheats and flours varied widely in protein contents and functional (breadmaking) qualities of the proteins. Evaluation of breadmaking potential was based on a straight-dough procedure to determine water absorption, mixing time, loaf volume, and crumb grain and texture. Indirect methods for determining quality included the sedimentation test and flow curve indexes determined by a rotation viscometric method. The flow curve indexes were correlated with functional breadmaking properties. High, significant correlations were obtained between loaf volume and the tear point of a meal flow curve (r = 0.923, curvlinear) and loaf volume and flow quotient of a meal flow curve (r=0.954). The rotation viscometric method is simple and rapid, requires small amounts of material (10 g) and can be performed on wheat meal or flour. Consequently, the method can be useful in screening large numbers of samples in plant breeding programs. AA

650 YOUSSEF (MM) and BUSHUK (W). Breadmaking properties of composite flours of wheat and faba bean protein preparations. **Cereal Chem. 63**(4); 1986; 357-61

Cotyledon flour of faba beans (**Vicia faba** L.) and three different protein preparations (conc. isoelectric isolate, and micellar mass) were used to prepare composite flours with wheat flour milled from two var. of hard red spring wheat (cv., Neepawa and Glenlea). All composite flours contained approx. 20% protein based on max. computed protein efficiency ratio. Differential scanning calorimetry results showed that the micellar mass protein appeared to be quite different (less denatured) from the protein in the isoelectric isolate. Farinograph and extensigraph results on doughs of composite flours showed a significant modification of rheological properties by the addition of each nonwheat component. Baking results indicated that all nonwheat components except the protein micellar mass had a negative effect on loaf volume of both wheat var. It was concluded that the protein micellar mass is compatible with wheat gluten in functionality for breadmaking. AA

MILLETS

Bajra

651 SHARADA (D), PRAMEELA DEVI (D) and SAILAKSHMI (N). Varietal differences in protein and calorie content of different varieties of bajra. **Indian J. Nutr. Diet. 23**(3); 1986; 66-8

22 var. of local and hybrid bajra (**Pennisetum typhodies**) grown in Agricultural Research Stations, Ahamednagar and Gwalior, India did not show significant differences in protein and energy contents. Protein content varied from 12.0 to 15.6 g% in Ahmednagar samples and 6.3 to 14.7 g % in Gwalior samples. The mean protein content of bajra from Ahamednagar (13.80%) was significantly higher than Gwalior (10.05%). The cal. content was 369 to 418 in the Ahamednagar sample and 370 to 432 in Gwalior samples. This supports the view that nutritive value of same grain grown in different areas varies. BSN

Maize

652 ABRAMSON (D), SINHA (RN) and MILLS (JT). Mycotoxin formation and quality changes in granary-stored corn at 16 and 21% moisture content. **Sci. Aliment.** 5(4); 1985; 653-63 (Fr)

653 CUEVAS (R) and PUCHE (C). Study of the rheological behaviour of corn dough using the farinograph. **Cereal Chem.** 63(4); 1986; 294-7

An expression for power consumption in the farinograph, considered as a mixer, was used to calculate indices of apparent viscosity and to study the rheological behaviour of corn dough. The results indicated that freshly prepared corn dough (65-70% moisture) behaves as a pseudoplastic fluid. In contrast to the behaviour of common fluid foods, the viscosity of corn dough (prepared from commercial, Venezuelan, precooked corn flour) increased with increasing mixing temp. possibly a result of effects of heat on the dough components. The results showed that the farinograph can be used to gain an insight into corn dough rheology. AA

654 LAMKIN (WM), UNRUH (NC) and POMERANZ (Y). Gas-chromatographic determination of low concentrations of propionic acid in grain sorghum. **Cereal Chem. 63**(4); 1986; 372-5

655 POMERANZ (Y), HALL (GE), CZUCHAJOWSKA (Z) and LAI (FS). Test weight, hardness, and breakage susceptibility of yellow dent corn hybrids. **Cereal Chem. 63**(4); 1986; 349-51

Test wt., 100-kernel wt., percent of floaters, hardness (density, near-infrared reflectance, and several parameters obtained from the Stenvert hardness test) and breakage susceptibility (Stein test) were determined in three mixtures of hybrids dried under various conditions and 10 individual hybrids dried under mild conditions. Breakage susceptibility showed a significant correlation, and test wt. and percent of floaters showed a large and very significant correlation with various measures of grain hardness. Kernel wt. and hardness were not correlated. AA

PULSES

Sorghum

656 SHARMA (RD). Dietary fibre profile of selected pulses. **Indian J. Nutr. Diet. 23**(11); 1986; 330-32

Five pulses analysed showed a fibre content of 35.2% in winged bean (**Psophocarpus tetragonolobus**), 26.0% in Bengal gram (**Cicer arietinum**) 20.8% in soybean (**Glycine max**), 19.6% in kidney bean (**Phaseolus vulgaris**) and 18.6% in khesari dhal (**Lathyrus sativus**). This pattern was seen in non cellulosic polysaccharides, cellulose and lignin contents, of the legume also. KAR

Bengal gram

657 VIJAYA KHADER and VENKAT RAO (S). Effect of cooking and processing on protein quality of Bengal gram, green gram and horse gram. **Indian J. Nutr. Diet. 23**(3); 1986; 57-65

The investigation deals with effects of steaming (5-40 min), autoclaving (5-60 min at 10 lb pressure), puffing (10 s and/or 10 min on hot sand), roasting and dehusking of (i) Bengal gram, (ii) green gram and (iii) horse gram on their PER and digestibility coeff. (DC) values. PER of (i) and (ii) were not affected by steam cooking, whereas autoclaving for 10 min slightly increased PER of (i), but did not affect PER of (ii). For nutritional quality, cooking of (iii) at 10-15 lb pressure for 20-30 min was found optimum. A significant improvement in PER was observed with dehusked (i) and (iii) and not in (ii). Puffed (i) showed a similar protein quality as that of cooked dhal. Roasting enhanced significantly PER score, of whole (iii) but not of (ii). On dehusking and puffing, the apparent digestibility of all the legumes showed improvement. BSN

Black gram

658 RAMADAS BHAT (U) and THARANATHAN (RN). Carbohydrate profile of black gram (**Phaseolus mungo**). **Cereal Chem. 63**(4); 1986; 376-7

Lentils

659 EL-SHERBINY (GA), RIZK (SS) and KHALIL (NF). Trials to raise the nutritional value of dried "Lentil soup" recipes. **Egypt. J. Food Sci. 14**(1); 1986; 213-9

Different recipes of dried lentil soup were prepared in various blends. The ingredients that incorporated were dried dehulled cracked lentil seeds, dried soybean seeds, dried chick-peas seeds, fresh carrots, fresh tomato, and fresh onion. In the former blends ingredients were cooked under pressure, then strained and dried in open oven at 70 C. The dried blends were milled and sieved to reach a 95% extraction ratio. Then the resulted powder were mixed to other dry ingredients to form different blends. Such blends however, were able to raise the nutritional values without impairing the organoleptic properties. Protein was raised quantitatively and adapted qualitatively to meet the F.O.A. pattern Best blend was that (No.6), which included lentil, soybean chick-peas, carrot, tomato, onion, and dried whole egg. AA

Peas

660 KALRA (CL), BEERH (OP), MANAN (JK), TEOTIA, (MS), SHARMA (TC), DHILLON (GS) and SHARMA (BR). Studies on the screening of new pea cultivars for dehydration. **Indian Food Packer; 40**(6); 1986; 16-21

Four pea var. (Pb-88, Pb-87, Sel-3487 and Bonneville) were analysed for physico-chemical characteristics and assessed for their suitability for dehydration and storage for 12 months. the range of values (in %) are moisture 75.6 to 77.2, total sugars 3.34 to 4.97, alcohol insolubles 15.12 to 18.29 and crude protein 6.59 to 6.72% among the var. Drying ratio ranged from 4.8:1 for Pb-88 to 5.0:1 for Bonneville. The rehydration ratio varied from 1:3.2 to 1:3.6 in freshly dried peas and 1:2.8 to 1:3.3 in samples stored for 3 months and 1:2.8 and 1:3.2 in 6 momth stored and 1:2.6 to 1:3.0 in one year stored samples. No significant difference was observed in swelling ratio among the var. during 1 yr storage. Seed bursting % was max. in Bonneville (4.0 - 6.5) and min in Pb-88. The var. Sel-3487 recorded the most favourable, acceptable colour followed by Pb-87 and Pb-88. In organoleptic evaluation var. Sel-3487 scored highest in colour, texture, taste and flavour and overall acceptability followed by Pb-88 during 3, 6 and 12 months of storage.

661 MAHENDRANATH REDDY (T), GUPTA (AK) and VARSHNEY (ML). The effect of pesticides of plant growth, nodulation, nitrogen fixation and protein content in fresh peas **(Pisum sativum L.) Pesticides. 20**(7); 1986; 36-8

The effect of some systemic insecticides like phorate, aldicarb, carbofuran, and BPMC on the growth of the plant, nodulation, symbiotic nitrogen fixation and protein content in fresh peas is discussed. BV

662 MEGHA (AV) and GRANT (DR). Effect of heat on the functional properties of pea flour and pea protein concentrates. **Can Inst Food Sci. Technol. 19**(4); 1986; 174-80

Functional properties of heated (50, 60, 70 and 98 C) and unheated pea flour (PF) and pea protein conc. (PPC), including N solubility index, water holding capacity, oil emulsification, oil absorption, foaming capacity and foaming stability were studied. N solubility and oil emulsification declined continuously; water holding capacity increased continuously; oil absorption increased to a max. and then declined; foaming properties were adversely affected except at 70 C. Both polyacrylamide gel electrophoresis and sodium dodecyul-sulphate polyacrylamide gel electrophoresis revealed heat induced changes in protein band changes in globulins isolated from heated and unheated samples. The ratio of vicilin to legumin decreased with increasing heat treatment. MVG

OILSEEDS AND NUTS

Groundnuts

663 AHMED (EM) and ALI (T). Textural quality of peanut butter as influenced by peanut seed and oil contents. **Peanut Sci. 13**(1); 1986; 18-20

Oil content, peanut seed content and the interaction of both factors significantly influenced the textural quality of peanut butter. Spreadability as measured by sensory methodology as well as instrumental measures indicated better quality as percent oil increased from 40 to 50% and peanut seed content increased from 90 to 95%. The higher peanut seed content had a significant improvement on the spreadability of the butter containing 40% oil with no influence for the 50% oil sample. The reverse was true for all adhesiveness measurements. Jamaican peanut butter exhibited textural qualities similar to the butter containing 40% oil. AA

664 DELWICHE (SR), SHUPE (WL), PEARSON (JL), SANDERS (TH) and WILSON (DM). Microwave vacuum drying effect on peanut quality. **Peanut Sci. 13**(1), 1986, 21-7

665 EL-SHARKAWY (AA), RADY (AH), MOSTAFA (MM) and KANDIL (SH). Changes in main components of raw and roasted peanut and sesame seeds. I. oil properties, fatty acid composition, hydrocarbons and sterol constituents. **Egypt. J. Food Sci. 14**(1); 1986; 13-22

The physical and chemical properties of oils and peanut and sesame seeds that were roasted at 100, 120 , 140 and 160 C for 2 hr were studied. The refractive index increased while acid value and unsaponifiable matter decreased. Iodine value showed a slight fluctuation. Peroxide value increased to a higher value at 120 C in the case of peanut seeds and at 140 C for the sesame seeds then it decreased when the seeds were heated at higher temps. As the roasting temp. increased, the total saturated fatty acids increased while total unsaturated fatty acids decreased in both seed oils. Palmitic acid, which represents the major saturated fatty acids in peanut and sesame seed oils showed a slight increase, while oleic acid decreased with increasing roasting temp. KAR

666 MEHAN (VK), McDONALD (D) and RAMAKRISHNA (N). Varietal resistance in peanut to aflatoxin production. **Peanut Sci. 13**(1); 1986; 7-10

Rehydrated, mature, undamaged seed of 502 peanut (**Arachis hypogaea** L) genotypes were scarified, inoculated with an aflatoxigenic strain of **Aspergillus flavus** Link, and tested for aflatoxin B1production after incubation at 25°C for 10 days. All genotypes supported production of aflatoxin B1but significant genotypic differences in levels of aflatoxin B1 production were found. Genotypes U 4-7-5 and VRR 245 supported the lowest levels of aflatoxin B1 (<10 µg/g seed,) whereas the commonly grown Indian cu TMV 2 supported production of aflatoxin B1 at levels of over 150 µg/g seed. Genotypic differences in levels of aflatoxin B1production were consistent over seasons. Production levels were slightly lower in seed from the rainy season crop than in seed from the two postrainy season crops. AA

667 MORGAN (MRA), KANG (AS) and CHAN (HWS). Aflatoxin determination in peanut butter by enzyme linked immunosorbent assay. **J. Sci. Food. Agric. 37**(9); 1986; 908-14

High specificity, high titre antisera to aflatoxins B1and G1 have been produced by immunisation of rabbits with a bovine serum albumin-aflatoxin B1 conjugate. The antiserum has been used to set up an indirect, double antibody microtitration plate enzyme-linked immunosorbent assay with a limit of detection of 0.1 pg toxin per well. The assay has been validated for application to peanut butter, and demonstrates many advantages over conventional methodology, including the requirement for minimal sample preparation before assay, its technical simplicity, and its potential high sample through-put. AA

668 WALIYAR (F). Comparative study of the evolution of the rhizospheric mycoflora in two varieties of groundnut (**Arachis hypogaea** L.) in Senegal. II. Analysis of the qualitative evolution of rhizospheric mycoflora. **Oleagineux. 41**(4); 1986; 189-94

The results obtained from the analyses of rhizospheric mycoflora in two var. of groundnut show that the development of this mycoflora depends on time. From a qualitative point of view, three phases are observed: initial, intermediate and evolved. The separate qualitative processing of the two var. revealed that the evolution of variety A comprises an extended initial phase, then an evolved phase, that of var B having three phases: initial, intermediate and evolved. Out of the 158 sp. present in the rhizosphere of the two var. **Aspergillus, Fusarium, Curvularia, Pencillium,** the Mucorales and the Sphaeropsidales make up the dominant mycoflora groups. AA

Soybeans

669 KAZEMZADEH (M), DIEHL (KC), Jr., RHEE (KC) and DAHM (PF). Mechanical and structural evaluation of texturized soy proteins of varying protein content. **Cereal Chem. 63**(4); 1986; 304-10

670 KIM (SH) and KINSELLA (JE). Effects of progressive succinylation on some molecular properties of soy glycinin. **Cereal Chem. 63**(4); 1986; 342-5

671 RAMADAN (AAS) and EMMAM (BS). Effect of heat treatment on amino acids entangled in canned soybean at two levels of heat. **Egypt J. Food Sci. 14**(1); 1986; 241-5

672 VAIDEHI (MP) and PADMA (K). Protein quality of soy blended milk, curds and textured vegetable product. **Indian J. Nutr. Diet. 23**(11); 1986; 315-20

Soy milk was blended with cows milk in 60:40 ratio and curd was also prepared from the blend and these were fed separately to rats and the PER and wt. gain was compared with those fed skim milk powder (SMP) and commercial textured vegetable protein (TVP) Test diets were prepared by blending with starch vitamin and salt and protein level was maintained at 10%. The PER of the soy blended curd was 2.84, commercial TVP 2.68, soy blended milk 2.33 and SMP 3.47. The mean wt. was always higher in rats fed SMP and commercial TVP than soy blended milk or curd. Soy blended milk showed higher growth rate than the soy blended curd in the first 2 wk and the last 2 wk it was vice versa. KAR

TUBERS AND VEGETABLES

Onions

673 KALRA (CL), BEERH (OP), MANAN (JK), TEOTIA, (MS), SHARMA (TC), SIDHU (AS) and SURJAN SINGH. Studies on the influence of cultivars on the quality of dehydrated onion (**Allium cepa Linn.**) **Indian Food Packer. 40**(4); 1986; 20-27

Five var. of white onions (**Allium cepa** ((i) Pusa white (round), (ii) White globe, (iii) Pb-48, (iv) VL-I and (v) S-74 and two of red onions ((vi) Punjab selection and (vii) N-53 obtained from Punjab Agricultural University, Ludhiana, Punjab, India, were examined for physico-chemical and dehydration characteristics, skin colour, average bulb wt. height and diam., shape index, yield of bulb (ha), peeling losses, recovery % of slices for dehydration, drying rate, moisture content after dehydration, rehydration ratio, total solids, soluble solids, total sugars reducing and non-reducing sugars, protein, and total ash and organoleptic properties (colour, texture, flavour, general acceptability, total score and overall acceptability) of dehydrated onion slices. Among the 7 var. (v) ranked first in total solids (14.3%), followed by (iii) (13.3%). In (v), ratio of reducing to non-reducing sugars was min. followed by (i). Dehydration ratio ranged from 7.8:1 in (iii) and (v) to 8.3:1 in (i) and (vii). (v) was found the most suitable var. for processing into dehydrated onions and could be stored for one yr at ambient temp., because of white flesh, moderate flavour, high % of total solids, high dehydration ratio and low reducing to nonreducing sugar ratio. BSN

Potatoes

674 KHURANA (DS), BAJAJ (KL) and RANDHAWA (KS). Post-harvest storage behaviour of potatoes - a critical review. **Indian Food Packer.** 40(4); 1986; 40-54a

Aspects covered include: losses due to post-harvest handling at high temp.; changes in the processing qualities at low temp.; ways to prevent storage losses by storage methods and use of naphthalene acetic acid, meleic hydrazide, isopropyl-N-(3-chlorophenyl) carbamate (CIPC) or chloropropham or 3-cl-IPC; and 2-chloroethyl-trimethyl ammonium chloride (Cycocel or CCC or chloramequat). BSN

675 KHURANA (DS), RANDHAWA (KS), RANDHAWA (JS) and MOHAN SINGH. Performance of the dehydrated chips prepared from stored potatoes treated with sprout inhibitors. **Indian Food Packer.** 40(4); 1986; 11-9

Various chemicals (maleic hydrazide (MH) (200 - 5000 p.p.m.), naphthalene acetic acid (NAA), (40 - 120 p.p.m.) triiodobenzoic acid (TIBA) (100 and 200 p.p.m.), 2-chloroethyl trimethyl ammonium chloride (CCC) (0.50 and 0.75 active ingredient/ha) and isopropyl-N(3-chlorophenyl) carbamate (CIPC) (4000 and 5000 p.p.m.) were applied as sprout inhibitors as preharvest or post-harvest sprays to (i) Kufri Chandramukhi (white) and (ii) Kufri Sindhuri (red) var. of potatoes and stored first in a cold room (2-3°C) and later in an evaporative cooling chamber fitted with a dessert room cooler (could lower ambient temp. by 8-13°C) for 75 days. The yield of chips was 156.0 and 156.1 g/kg of potatoes from (i) and (ii) resp.; yield of chips increased when stored for 75 days in evaporative cooling chambers. Preharvest application of MH and NAA at 5000 and 40 p.p.m. resp. increased the chips yield. Chips from fresh tubers of (ii) were pigmented but not those from (i). This is attributed to enzymatic factors. Browning increased in (i) and (ii) kept in refrigerated storage before processing. Browning intensity was not affected by the sprout inhibitors. (i) was considered better with respect to the processing traits. None of the chemicals affected the processing attributes during the post harvest holding period. KAR

676 RAMAKRISHNA (P) and KAMAL PRAKASH. A simple method for production of flat dehydrated potato chips. **Indian Food Packer.** 40(6); 1986; 12-5

To prevent the curling of potato chips during sun drying, the blanched chips were put during drying in between two M.S. wiremeshes (0.5 x 0.5 m) held tightly together. A typical drying curve drawn shows that the chips starts curling during the last stage of constant rate period and the moisture in the chips at the start of rigidity was 35-40% which is reached after 1-1 1/2 h of drying depending upon thickness. Putting the chips in between the wiremesh at 35% moisture gave almost flat chips; about 1 sq. m. area of wire mesh was needed to produce 1.75-2.00 kg of dry slices. KAR

Cauliflowers

677 BAWA (AS) and SAINI (SPS). **Drying and shelf life of fresh cauliflower. Indian Food Packer.** 40(6); 1986; 7-11

Fresh cauliflower (var. Giant Snow Ball, No.26, No.35, No.35A) were stored under refrigerated (4°C) and room temp. (20-30°C) for 72 h and the changes in % solids, protein, ascorbic acid, and ash, were recorded. Another batch was dried in a cabinet dryer at 60 ± 2°C to < 5% moisture content and the rehydration ratio was determined after cooking for 15, 30, 45 and 60 min. Moisture loss was more at 20-30°C than at 4°C. Protein and ash content did not show much variation during storage at both the temp.; loss in ascorbic acid was more at 4 C than at 20-30°C. Var. No. 26 spoiled within 72 h at 20-30° C while Giant Snow Ball fared the best at both the storage temp. Giant snow ball showed the lowest shrinkage ratio (13.4%) and the overall shrinkage ratio was max (37.9%) for No.35A var. and min (25.2%) for Giant Snow Ball. The sorption isotherms were similar for all the var. except Giant Snow Ball. The max. rehydration ratio achieved after 60 min of cooking was 8.1 for No.35A and 8.0 for Giant Snow Ball. The equilibrium moisture contents at 100% RH was around 54% for all the var. Giant Snow Ball was the best var. as fresh produce and as a dehydrated product. KAR

678 PIZZOCARO (F) and MONTEVERDI (R). Blanching pre-freezing in some brassicaceae. **Ind. Aliment. 24**(10); 1985; 783-7 (It)

Studies have been carried out, in vivo, on the kinetics of heat inactivation of peroxidases and lipoxygenases in cauliflower, broccoli and turnip tops, at temp. from 60 to 100°C. The inactivation curves show a biphasic tendency. A temp. of 100°C only was capable of ensuring complete inactivation in a short time. But this temp. also favoured a secondary catalytic activity of a non-enzymatic nature, resulting in lipid oxidation. This activity is caused by the products of heat denaturation of the hemoproteins (peroxidase and catalase). It increases with heat treatment; after 8 min. of treatment, it is equal to 15, 26 and 50% of the lipoxygenase activity of the fresh cauliflower, broccoli, and turnip tops resp. Since this activity appears after the second min. of blanching - and even earlier in cauliflower - it can interfere with the normal process of blanching pre-freezing of vegetables. KMD

679 PIZZOCARO (F), SENESI (E) and MONTEVERDI (R). Lipid stability in frozen cauliflower, in relation to heat pre-treatments. **Ind. Aliment. 24**(5); 1986; 372-7

Non-blanched cauliflower stored at -20°C for 9 months showed a marked degradations of its lipid component, as indicated by its TBA value, low content of linoleic acid, and appearance off-flavours and off-colours. A blanching treatment at 100°C for 180 sec completely suppressed peroxidase activity, and reduced the non-enzymatic lipid oxidizing activity to 20% of its original value. This sample showed a remarkable stability in its fatty acid composition and organoleptic properties for a period of 9 months. The cauliflower blanched at 100° C for 40 sec. had a residual peroxidase activity of 20%, and a residual non-enzymatic oxidation activity of 10%. Its fatty acid composition remained stable during 9 months of frozen storage; the sample was organoleptically acceptable, even though it had a slight brown discolouration. KMD

Peppers

680 MILLER (WR) and RISSE (LA). Film wrapping to alleviate chilling injury of bell peppers during cold storage. **HortScience. 21**(3); 1986; 467-8

Bell peppers (**Capsicum annuum L.**), individually wrapped in plastic film or nonwrapped, were held 7, 14, or 21 days at 1, 4 , or 7°C plus an additional 5 days at 15 to evaluate the effect of film wrapping on chilling injury. Film wrapping did not reduce the incidence of visible chilling injury on either pericarp or seeds. Chilling injury was progressively more severe the lower the storage temp. AA

Spinach

681 EL-SHERBINY (GA), RIZK (SS) and EL-SHIATY (MA). The effect of different methods of blanching on the quality attributes of frozen spinach (**Spinacia oleracea**). **Egypt. J. Food Sci. 14**(1); 1986; 75-81

Frozen spinach (500 g samples) prepared by different blanching methods (steam blanching, boiling water, 2 % boiling citric acid solution, 2 % boiling Mg citrate solution and boiling water before addition of 0.5 gm Mg citrate) for removal of oxalates was investigated for total solids, total soluble solids, pH value, vitamin C chlorophyll retention percentage, carotenoids, oxalates, minerals and ash. Organoleptically the best treatment was found to be the combined effect of water blanching and insertion of 0.5 gm Ma citrate in each 0.5 kg pouch of frozen spinach. MVG

682 RAMADAN (AAS). Fate of parathion in field sprayed spinach before harvest. **Egypt J. Food Sci. 14**(1); 1986; 253-8

Tomatoes

683 BENK (E). On the composition and evaluation of tomato ketch-up. **Gordian. 86**(6); 1986; 111-2 (De)

The composition of tomato ketch-up has been reported, on the basis of data available in the literature. This is followed by a report on the evaluation of this product in accordance with various regulations and guidelines for tomato ketch-up for fruit and vegetable processing, law on food and utensils, ordinance on permitted additives, etc. KMD

FRUITS

684 BUNTROCK-TAUX (E). Lead in double concentrated tomato pulp. **Dtsch. Lebensmittel-Rundschau. 82**(9); 1986; 293-6 (German)

685 CAMPI (C). Preservation of fruits: Fundamental bases of the candying process. **Ind. Aliment. 24**(10); 1985; 796-8

Recipes for the preservation of the following fruits, prior to candying have been reported: cherries; diced orange and lemon peel; whole oranges and mandarins; citrus; pears; apricots; figs; reticulated melons; turnips; pumpkins. KMD

686 KHURDIYA (DS) and SUSANTA K ROY. Solar drying of fruits and vegetables. **Indian Food Packer. 40**(4); 1986; 28-9

A solar drier with chimney (outlet for smoke) effect was constructed using wooden frame, tin sheets and glass. It appeared hollow cube (89 cm^3) with a chimney (20 cm^3 x 76 cm) at top. The bottom of the drier was made of wooden structure 25 cm above the ground having 64 holes each of 2.5 cm diam. Four trays (each 80.5 cm x 40 cm) could be kept in two tier system. Whole ber fruits and potato slices were dried with tray load of 1000 g/3000 sq. cm after blanching and sulphiting. Drier without ventilation gave higher temp. throughout the day from March to June. 1st tray maintained higher temp. than 2nd tray. Max. temp. was obtained in drying with plain glass, followed by amber glass, chimney, and direct sun. Rate of evaporation of water was faster in sun (one day) followed by 1st tray (2 days) and 2nd tray (1 day 4 h); 25% opening of ventilation was better for max. evaporation. In Ber, drying rate was fastest in solar drier with plain glass, followed by solar drier with amber glass, direct sun and solar drier with chimney. But for the potatoes the drying rate was fastest in direct sun followed by solar drier with plain glass, amber glass and with chimney. Moisture content of dried Ber was between 11.26 and 15.24% SO_2 retention was max. and non-enzymatic browning min in those dried using solar drier with chimney. Moisture content of dried potato slices ranged from 5.35 to 7.03%, Retention of SO_2 was max. in those dried in solar drier with chimney. Non enzymatic browning and reconstitution ratio were not much influenced by drying in different driers. BSN

687 VISSER (FR) and GURNSEY (C). Inconsistent differences between neutral detergent fiber and total dietary fiber values of fruits and vegetables. **J. Assoc. Off. Anal. Chem.** 69(4); 1986; 565-7

Results with large number of fruits and vegetables showed that total detergent method (TDF) is more precise than the neutral detergent method (NDF). Further, the NDF values for apples and for miscellaneous fruits and vegetables were significantly higher and for stonefruit it was significantly lower. The differences between NDF and TDF were not significant for berry fruit. It was also found as group different in the values were also not existant, it was not possible to estimate results of one method from the results of the other. MVG

Amla

688 VIJAY SETHI. Effect of blanching on drying of amla. **Indian Food Packer.** 40(4); 1986; 7-10

'Desi' (local var. of Amla **(Phyllanthus emblica)** fruits (92% edible portion), was studied for the retention of ascorbic acid and tannins during (i) fresh state, (ii) after blanching in boiling water for 4 min and (iii) dry pulp from raw fruit. Results have shown that (iii), (ii) and (i) contained 1699.09, 116.7 and 573.39 mg% of ascorbic acid on dry wt. basis resp. and that (iii) retained better colour due to lesser degree of non-enzymatic browning than (i) and (ii). (ii) showed better retention of colour during storage than (i) and (iii) due to higher degree of inactivation of polyphenol oxidase. (iii) gave a powder rich in ascorbic acid (98.23%) and tannins (92.13%), which could be used in the preparation of curry powder or in soups to enhance nutritive value. BSN

Apples

689 LIU (FW), TURK (JR), SAMELSON (D) and KENYON (DJ). Low-ethylene CA storage of 'McIntosh' apples in a semi-commercial sized room. **Hort Science.** 21(3); 1986; 480-84

The results of the study indicate that it is possible to keep the firmness and freshness of 'MeIntosh' apples for 7-5 months in low-ethylene CA storage. The procedure includes a midsummer true spray with diaminozide, harvest date determination based on the internal ethylene of nondaminozide apples and continuous ethylene removal from storage. KAR

690 VORAGEN (FGJ), SCHOLS (HA), and PILNIK (W). Structural features of the hemicellulose polymers of apples. Z. **Lebensmittel-Unters Forsch. 183**(2), 1986, 105-10

The results of this study indicate that the apple hemicellulose extract consists of fucogalactoxyloglucans, pectic arabinans and galactans, (gluco-) mannans, (arabino-)xylans, and 1,3 linked glucans. Fucogalactoxyloglucans and pectic arabinans and galactans were isolated as such, and in complexes with each other and with (arabino-) xylans. The major part of the mannans is not linked to other hemicellulose polymers. AA

Bananas

691 FERNANDEZ (T), FERNANDEZ (M), and CHORDI (A). Evolution of proteins during ripening of the fruit of the **Musa cavendishii** - A study by electrophoresis and immuno-electrophoresis. **Fruits; 40**(10); 1985; 637-43

The evolution of the proteins was studied during the ripening of the **Musa** cavendishii dwarf var. which is cultivated in the Canaries. During this process we observed a quantitative growth of the protein content of the fruit pulp: from 0.90 mg/ml in the full but not ripe fruits, it rose to 1.38 mg/ml in the ripe fruits. From a qualitative point of view we observed, by electrophoresis with polyacrylamide gel, a growth of the bands and, by immunoelectrophoresis, we found great quantities of the four proteins detected, in our prior studies in the samples of fruit pulp in the first stages of development. AA

692 NOLIN (J). Condition of maturity of bananas (CV Giant Cavendish) at harvesting: A new measuring method. **Fruits. 40**(10); 1985, 627-35

After a bibliographic analysis on the different measuring techniques of the maturity of banana tree and plantain fruits, were laying the foundations of a new method of detn. After sampling of the bunches, the lots of bananas (CV Giant Cavendish) are treated with different concn. of Ethephon (Chloro acid-2-phosphoric ethyl). We established a straight line of regression between the duration of the preclimacteric phase of a sample lot and the minimal conc. of Ethephon allowing release of the climacteric crisis (r = 0.90). This allows us to better predict the duration of the green life of the fruits than their grade (r = 0.79). This method is relatively rapid and independent of the external morphology of the fruit. We discuss the possibility of returning later to a criterion easily usable in farming (particularly in the grading of fruit) in order to come up with a system of advice on harvesting by identification of the most favourable cutting grade. The end of the preclimacteric phase may be displayed by measures of conductance. There exists a good correlations (r = 0.78) between respiratory intensity (ml CO /kg/h) and measures of conductance. AA

Grapes

693 AUDINOS (R), LURTON (L), MOUTOUNET (M). Advantages of electrodialysis to produce sweetening products from grape. **Sci. Aliment** 5(4); 1985; 619-37 (Fr)

Three grape musts were deionized by electrodialyses, in order to produce sweetening agents. The rate constants for the elimination of tartaric acid of and of the potassium ion were determined, as also the rate constant for the evolution of the CP ionization product of potassium bitartrate. The slight loss of sugar, the considerable drop in the SO_2 level, and the energy cost that occur in the course of this deionization were measured. The variation in the browning index of electrodialyzed musts at 20 and at 40°C was followed over a period of time. KMD

694 MIGUEL (C), MESIAS (JL) and MAYNAR (JI). Evolution of amino acids during the maturation of grapes of the var. Cayetana and Macabeo (*Vitis vinifera*). **Sci. Aliment.** 5(4); 1985; 599-605 (Fr)

695 MOURGUES (J), OLIVIERI (CR), CONTE (T), PLANQUE (J), CHABRIE (P) and PETIT (R). Preparation of jellies and jelly candies from grapes. **Ind. Aliment. Agric.** 103(4); 1986; 191-7 (Fr)

Recipes are given for the production of the various products from (i) fresh and frozen grapes; and (ii) juices and conc. grape juices prepared on a semi-industrial scale. The products covered include juices and conc. juices, jellies of various types - extra, usual, dietetic with other fruit flavours or with grapes only - and preserves. KMD

Mangoes

696 JOSHI (GD) and ROY (SK). CFB box - an effective alternative to wooden crates for transport and storage of mango cv. Alphonso. **Indian Food Packer.** 40(6); 1986; 32-47

Corrugated fibreboard box (CFB) (dimension 43.0 x 32.5 x 29.0 cm) with 3 partitions (CFBP) and with 3 trays (CFBT) were fabricated separately to hold about 60 mangoes in each box for transportation and compared with those mangoes packed in CFB box with dry grass and news paper (CFBG) conventional wooden crates with straw and news papers (WCSN) as cushioning material. Boxes packed with Alphonso mangoes were transported from Dapoli to New Delhi (India) first by road and then by rail and were stored at room temp. (25-32.2°C and 44-76% RH) and at cold storage (10 ± 1°C and 85 to 90% RH). Fruit ripening was faster in WCSN during transport and storage at 25-32.2°C and 10+1 C followed by CFBG, CFBT and CFBP. Lower spoilage and shrivelling was observed in CFBP during storage and the fruits in these boxes also showed less physiological loss in wt. than CFBG and WCSN. CFBP exhibited higher moisture, starch (till ripening), acidity ascorbic acid and tannin contents in the fruit during transport and slightly lower soluble solids, sugars, total carotenoid pigments and pH during storage than any other packaged material. Of the different packages, CFBP appeared best for transporting mangoes and for subsequent storage at room temp. or in cold storage. KAR

Oranges

697 RIZK (SS), EL-SHERBINY (GA) and YOUSEF (GS). Biphenyl absorption of treated orange. **Egypt. J. Food Sci.** 14(1); 1986; 83-9

Absorption rate of biphenyl was determined in used pads, whole orange fruit, peel and juice stored under different conditions of ventilation, temp. and storage period. It was found that the rate of biphenyl absorption complied with the maximum permitted level of biphenyl in the United States and in most of the European Countries if packed in vented cartons as it is usually done commercially. However, with non-vented cartons, the absorption rate increased above the upper level of the absorbed biphenyl permitted by both Germany and France, when stored at 60°F. Generally the non-vented cartons efficiently decreased the rate of orange decay compared with vented ones. AA

Peaches

698 NGUYEN-THE (C), SOUTY (M), and BREUILS (L). Degradation of peach pectic substances by **Rhizopus stolonifer** - 2. In vivo mechanism. **Sci. Aliment.** 5(4); 1985; 639-52

A **Rhizopus stolonifer** infection of peaches provokes an degradation of the protopectins of the fruit. In a preliminary study of the mechanism of this phenomenon, the authors have shown that **R. stoloni-**

fer breaks the rhamno-galacturonic chains of the pectic substances into small fragments, but apparently leaves intact the strongly branched portions of the mol. Thus, the polygalacturonases produced by the parasite in the infected fruits seem to play a major role in the degradation of the pectic substances. KMD

SUGAR, STARCH AND CONFECTIONERY

Jaggery

699 JAVALEKAR (DV), SHINDE (BN) and RANDIVE (SJ). Use of ortho-phosphoric acid in jaggery making. I. Effect on physical properties. **Indian Sugar. 36**(5); 1986; 193-8

Ortho-phosphoric acid at 20, 40, 60, 80, 100, 120 and 140 ml/720 l pan on physical properties viz. texture, hardness-streak, taste, pore space and colour of jaggery was studied and compared with no phosphoric acid control and hydros. Jaggery was slightly granular and hard when 40, 60 and 80 ml phosphoric acid was used. At higher levels, non crystalline and sour jaggery was obtained. Ideal porosity was found at 20 and 40 ml phosphoric acid. Phosphoric acid and pore space are inversely related. Only 80 ml of phosphoric acid gave jaggery which had as good colour as jaggery obtained with hydros. Pore space decreased and colour intensified during storage. 40 ml phosphoric acid appears to be optimum for getting good physical properties of jaggery. MVG

Sugar

700 DOSS (KSG). Extraction of sugar from sugarcane by steam-aided imbibition (SAI) process. **Res. Ind. 31**(3); 1986; 259

Improvement in recovering sugar from sugarcane are reported. The original imbibition process has disadvantages in that the air gets into interstices between bagasse particles as well as into the pore particles while the bagass expands during emergence from the mill. The air hinders the contact of imbibition water or juice with bagasse particles; this hinders the extraction of sugar. These disadvantages can be removed by spraying jets of steam at the emerging bagasse while imbibition water is being added thus creating an atmosphere of steam which is absorbed by the expanding bagasse. The steam condenses on the bagasse surface and heats it up and the condensation also causes a suction effect by which imbibition water is drawn into the bagasse thus causing an effective water bagasse contact. MVG

Sugar beat juice

701 BOURDAREL (MJ) and RAMIREZ (A). Comparative action of two chemical bactericides on the alcoholic fermentation of beet juice and molasses. **Ind. Aliment. Agric. 103**(4); 1986; 219-24 (Fr)

Sugar beet juice and distillery molasses ferment in non-sterile conditions; and are therefore exposed to bacterial contamination. Hence, the authors have tested the action of two bactericidal agents - peracetic acid and hydrogen peroxide - on an industrial substrate, in the presence of yeasts. The results are encouraging for, it is possible to determine a dose that will control the bacterial contamination without producing any severe effect on the fermentative activity of the yeast. KMD

702 EL-SHERBINY (GA), RIZK (SS) and YOUSEF (GS). Utilization of beet molasses in the production of lactic acid. **Egypt J. Food Sci. 14**(1); 1986; 91-100

At 45 C the best yield and conversion of lactic acid was 62.6 % and 80.7 % respectively. A concn. of 18 % of total solids in the molasses gave best results and the optimum pH was 6. The best yield and conversion coeff. was obtained after 8th day of fermentation which could be considered optimum. The optimum sugar concn. was around 12.62 %.

703 NEIDERT (E), BARANIAK (Z) and SAUVE (A). Rapid quantitative thin layer chromatographic screening procedure for sulphathiazole residues in honey. **J. Assoc. Off. Anal. Chem. 69**(4); 1986; 641-3

Honeys

704 WHITE (JW), MELOY (RW), PROBST (JL) and HUSER (WF). Detection of beet sugar adulteration of honey. **J. Assoc. Off. Anal. Chem. 69**(4); 1986; 652-4

Starch

705 SCHAEFER (F). Starch drying and cooling. **Manuf. Confect. 66**(10); 1986; 67-9

Covers moisture and heat removal methods, support systems; whirl layer system; starch conditioning, energy conservation and capacity. BV

Confectionery

706 EYNCK (V). Dry mixing system in manufacture of confectioner coating. **Manuf. Confect. 66**(10); 1986; 57-9

This article covers compound coating, processing methods, wet processing, dry processing and impact grinding. BV

707 PLAYER (K). Emulsifier application for confectionery products. **Manuf. Conf. 66**(10); 1986; 61-6

Briefly covers regulated emulsifiers; emulsifier classification; application and functional properties of emulsifiers; emulsifier selection; emulsifiers and coating fats; and uses of various emulsifiers for chocolate and chocolate analog coatings. BV

708 SPICHER (G) and ISFORT (G). Causative agents of mould formation on baked products. Part 7. Mould on confectionery. **Getreide Mehl Brot 40**(6); 1986; 180-84 (De)

Incidence of mouldiness in fine baked goods topped with cream was 25-58%, while in pasty goods made from yeast-raised fine doughs it was 80-90%. Sometimes, mould formation occurred much earlier than the end of the specified shelf-life period. Use of preservatives reduced incidence of mouldiness only to a minor extent. Among the 210 organisms that were isolated, 50.5% belonged to the genus **Aspergillus**, 31% to **Penicillium**, 2.9% to **Rhizopus** and **Mucor**, 4.7% to **Cladosporium**, **Sporendonema**, **Alternaria**, and **Oospora** and 10.9% to yeasts. KMD

Candy

709 SCHULZ (WH). Sensory evaluation and consumer testing: How a candy manufacturer can develop its own system. **Manuf. Confect. 66**(10); 1986; 53-5

Covers simple interest rating, evaluation; paired comparison; subject resources and triangle testing. BV

710 VINK (W). Continuous processing of hard candy: A different approach. **Manuf. Confect. 66**(10); 1986; 47-9; 51-2

This article covers batch cooking, open fire cooking, the simplex kattle; other batch cooker, semicontinuous cooker; fully continuous cookers; problems; reformulation and fully automated cooker for low corn syrup formulations. BV

BAKERY PRODUCTS

711 BRAY (F). Croissants and other frozen bakery products. **Ind. Aliment. 25**(3); 1986; 201-3 (It)

712 WASSERMANN (L). What the producer of baked products should know about the nutrition behaviour of the consumers. **Getreide Mehl. Brot. 40**(6); 1986; 186-9 (De)

Biscuits

713 ABD EL-LATIF (ARM), GALAL (AM) and IBRAHIM (AA). Using millet flour and sodium stearoyl-2-lactylate in the production of cookie from hard wheat flour. **Egypt J. Food Sci. 14**(1); 1986; 231-6

The rheological properties and possible food applications of millet flour have been studied with particular reference to cookie production. MVG

714 NARDI (A). Computer in biscuits production. **Ind. Aliment. 25**(3); 1986; 204-8 (It)

Bread

715 BAUR (H). Italy's showcase bread plant: Automation provides fast, quality baking under most sanitary conditions. **Ind. Aliment. 25**(3); 1986; 223-6 (It)

716 CINDIO (B), CORRERA (S), NADDEO (C) and SAGGESE (A). Modelling of bread making process. 1. Mixing and fermentation. **Ind. Aliment. 24**(10); 1985; 799-807 (It)

A mathematical model that simulates mixing and fermentation phases of bread making process has been developed in order to define the best condition of working according to soft crumb requisites in the bread. Capital importance has been given to rheological characteristics and their influence on the final vol. achieved. A modelling of linear viscoelasticity has shown to be the most suitable to be able to explain the gas bubbles expansion phenomenon due to diffusion of the carbon dioxide produced by fermentation, inside the air nucleus entrapped during the mechanical mixing. AA

717 CINDIO (B), NADDEO (C), SAGGESE (A) and CORRERA (S). Modelling of bread making process. 2. Baking. **Ind. Aliment. 25**(5); 1986; 357-64 (It)

718 HIRONAKA (Y). Relationships between sensory flavour evaluation and gas-chromatographic profiles of French bread. **Cereal Chem. 63**(4); 1986; 369-72

719 MOHSEN (SM), ALIAN (AM), ATTIA (R) and EL-AZHARY (T). Specificity of lipase produced by **Rhyzopus delemar** and its utilization in bread making. **Egypt. J. Food Sci. 14**(1); 1986; 175-82

The hydrolysis of olive oil by lipase at different enzyme units and for different incubation periods was studied. Thin layer chromatographic analysis showed that each hydrolyzate contained monoglycerides, 1, 2 and 1, 3 diglycerides, free fatty acids and unattacked triglyceride indicating that it is unspecified lipase. Addition of lipase during dough making was also investigated and results showed that it retards staling of bread loaves without causing any undesirable changes in their organoleptic properties. AA

720 RAMADAN (AAS). Some characteristics of Egyptian Balady bread as affected by partial substitution of maize flour in relation to economic state. **Egypt. J. Food Sci. 14**(1); 1986; 237-40

721 SARHAN (MA), MOSTAFA (MK) and MORTADA (NS). Effect of soybean flour and improvers on bread quality. **Egypt. J. Food Sci. 14**(1); 1986; 183-90

Sedimentation value, fermentation time, height, vol. and relative vol. of bread decreased with the increase in soybean flour percentage added in flour mixtures. Addition of potassium bromate up to 18 p.p.m to flour mixtures containing 3%. Soybean flour enhanced quality of both flour and bread. The improving effect of L-ascorbic acid was better than that of potassium bromate. No improving effect was noticed with flour mixtures containing 6% soybean flour. AA

722 STEPHAN (H), BRUMMER (JM) and WEIPERT (D). Triticale - Raw material for the production of bread and rolls. **Getreide Mehl Brot. 40**(7); 1986; 208-12 (De)

Addition of triticale flour or whole meal to bread dough was, disadvantageous in breadmaking. As regards labelling of bread made with triticale there are two possibilities:- (i) either a triticale bread should contain atleast 90% triticale, as is required in the case of wheat or rye bread; or (2) triticale can be put on par with barley, oats, or rye in which case a triticale level of 20% would be sufficient to call the product a "triticale" bread. The authors prefer the first alternative. KMD

723 SUZUKI (K), McDONALD (CE) and D'APPOLONIA (BL). Near-infrared reflectance analysis of bread. **Cereal Chem.** 63(4); 1986; 320-25

The possibility of analyzing fresh bread for constituent content or quality factors by the near-infrared (NIR) reflectance method was investigated. Lab. analyses of two loaves of bread showed moisture was highest at the center of the slice, whereas protein and lipid content (dry basis) were evenly distributed throughout the loaf. Thus, constituent content of a loaf on dry moisture basis could be calculated from NIR-determined moisture and "as is" constituent content measured on center disks cum from fresh bread slices. NIR calibrations for moisture, protein, sugar, and lipids were developed and tested on center disks cut from fresh slices of white bread. Statistics indicated moisture and protein could be accurately determined by NIR reflectance, whereas the sugar and lipid analyses were less accurate. AA

724 TAHA (FS), HAMOUDA (AA), and EL-RAYES (F). Composition and sensory evaluation of bread and anise biscuits enriched with peanut protein products. **Getreide Mehl. Brot.** 40(7); 1986; 213-5 (De)

Various peanut products (viz. peanut flour, protein concentrate, protein isolate) were used to fortify wheat bread and biscuits flavoured with anise. The level of additions was 5 and 10%, so that the protein content of the bread was raised by 17-70% and of the aniseed biscuits 7 to 50%. Sensory tests showed that peanut products can very well be added at levels of 5 and 10% to wheat flour, to improve the nutritive value of products like bread or biscuits. KMD

725 TAUFEL (A), RUTTLOFF (H) and SCHLOBACH (CR). A new method of the manufacture of breadcrumb. **Ind. Aliment.** 25(3); 1986; 227-30 (It)

726 VIJAYA KHADER and RANJAN DAVE. Baking temperature and time on the quality and nutritive value of germinated wheat bread. **Indian J. Nutr. Diet 23**(4); 1986; 106-14

The effect of high temp. (45 to 285 C), and baking time (3.5 - 7.0 min) on the nutritive value (PER and lysine) of bread prepared from 24 and 30 h germinated wheat and its acceptability by a taste panel has been studied. Due to undesirable flavour and texture, bread from 30 h germinated wheat was found unacceptable, whereas bread from 24 h germinated wheat was acceptable. Nutritional studies have shown that modern bread (commercial name given in India to refined wheat bread) and whole wheat bread had similar nutritive value. Baking at 285 C for 3.5 min was found optimum for processing germinated wheat bread. BSN

Chapati

727 HARIDAS RAO (P), LEELAVATHI (K) and SHURPALEKAR (SR). Test baking of chapati-Development of a method. **Cereal Chem.** 63(4); 1986; 297-303

With the goal of developing a standard method for test baking of chapati, a staple food in the Indian subcontinent, studies were made on the standardization of conditions for preparing chapati dough. Variables considered were consistency and rolling characteristics, thickness of the dough sheet, time and temp. of baking, and puffing conditions of the chapati. Water requirements for preparing chapati doughs of desired consistency were determined with a research water absorption meter (Henry Simon). The values compared well with those recorded on a Brabender farinograph under modified conditions. The method developed for test baking of chapati used a Hobart mixer for preparing the dough, a specially designed platform for rolling the dough sheet to a uniform thickness, a circular die for cutting the sheet, an electric hot plate for baking, and a gas tandoor oven for puffing the baked chapati. The test baking method was applied successfully to evaluate chapati-making quality of six commercial wheat var. The results also showed that in addition to the subjective evaluation of texture, three objective parameters - height of puffed chapati, pliability as measured by a new designed device, and shear value - can serve as simple indices of chapati quality. AA

Cereal bars

728 ALTVATER (F). Composition and production of cereal bars. **Getreide Mehl Brot** 40(7); 1986; 215-9 (De)

Different types of cereal bars and their manufacture have been described. They are made from dry cereal products along with a suitable binder. The machinery used in their manufacture has also been indicated. Cereal bars seem to have good long-term prospects on the market because of their high nutritive value, their health-promoting effects, and their excellent taste. KMD

Pasta

729 POMPEI (C), LUCISANO (M) and BALLINI (N). Use of lupin flour in the production of pasta. **Sci. Aliment.** 5(4); 1985; 665-86

Pasta products were prepared, using some lupin flour along with soft wheat semolina, rice flour, and potato starch, respectively. The products were prepared by two methods: i.e. with and without a gelatinization treatment of the starch. Optimum cooking time ranged between 4 min. 30 sec. and 6 min., the shorter period being sufficient for samples made with rice flour. Presence of 1% monoglyceride stearate in the dough reduced the loss of both total solids and protein. The breaking strength of uncooked pasta was increased by the addition of lupin flour. The firmness of the cooked product, made from a dough containing 30% lupin flour, was significantly lower than that of a product made from commercial macaroni. Moreover, the acceptability of the samples containing lupin flour was rather low, because of the beany taste typical of lupin flour. KMD

730 SCHREURS (E), SEIBEL (W), MENGER (A) and PFEILSTICKER (K). Influence of cooking water on the cooking quality of pasta products, in relation to the quality of cooked pasta. Part 3. Gelatinization behaviour of pasta suspensions with different cooking waters. **Getreide Mehl Brot 40**(7); 1986; 219-23 (De)

MILK AND DAIRY PRODUCTS

731 CAMILLERI (C), JOVER (JP), de PIERREFEU (A) and MEYER (F). A effective procedure for the exploitation of lactoscrum permeate for energy. **Ind. Aliment. Agric. 103**(5); 1986; 387-9

732 HEMME (D), FERCHICHI (M) and DESMAZEAUD (MJ). The future of lactic and non-lactic leavens. **Ind. Aliment. Agric. 103**(5); 1986; 318-24

733 MARIN (V), MORETTI (G), CANOVA (F) and BORTOLI (A). Environmental characteristics of some dairies in Venetian region. **Ind. Aliment. 25**(6); 1986; 450-54 (It)

734 MILLS (OE). A headspace sampling method for monitoring flavour volatiles of protein products. **NZ J. Dairy Sci. Technol. 21**(1); 1986; 49-56

A method is described in which the volatiles from a protein product solution were trapped on a porous polymer and subsequently desorbed in the injector port of a gas chromatograph. The head space profile was then obtained using a capillary column. KAR

735 STEAD (D). Microbial lipases: their characteristics, role in food spoilage and industrial uses. **J. Dairy Res. 53**(3); 1986; 481-505

736 VICKERS (VT). Control of airborne contamination in dairy processing plants. **NZ J. Dairy Sci. Technol 21**(2); 1986; 89-98

Location of dairy processing sites, factory building design and plant layout and ventilation systems are some of the points stressed. KAR

737 ZAYAS (JF). Effect of ultrasonic treatment on the extraction of chymosin. **J. Dairy Sci. 69**(7); 1986; 1767-75

Milk

738 BLANCHET (M). Milk products industrial markets. **Ind. Aliment. Agric. 103**(5); 1986; 394-8

739 BRINKMAN (MBC), GEND (HW) and MATTERN (EM). Automated determination of 4,4'-diaminodiphenyl-sulfon (DDS) and the acetylated metabolites (MADDS and DADDS) in milk with the aid of the FAST-LC-system. **Z. Lebensmittel-Unters Forsch 183**(2); 1986; 97-100 (De)

740 BUCKLEY (KE), FISHER (LJ), and MacKAY (VG). Electron capture gas chromatographic determination of traces of formaldehyde in milk as the 2, 4-dinitrophenyl-hydrazone. **J. Assoc. Off. Anal. Chem. 69**(4); 1986; 655-7

741 CROMIE (SJ), SCHMIDT (D), and GILES (JE). The effect of reverse osmosis concentration and subsequent storage on the microflora of raw milk. **NZ J. Dairy Sci. Technol. 21**(1); 1986; 1-7

Standardised raw milk was conc. to half its original vol. in a continuous reverse osmosis pilot plant at 50°C. Milk pretreated to 50 C, conc. and reconstituted conc. were stored for 10 days at 4°C. Reverse osmosis at 50°C had significant effects on the microbiological quality of the raw milk before and during storage. The standard plate count in the conc. was similar to the initial count in the standardized raw milk inspite of the two fold concn. Counts of psychrotrophic, proteolytic, lipolytic and coliforms bacteria and of yeasts were lower in the conc. than in the standardized raw milk. The conc. took 3.5 days longer than the standardized raw milk to reach a standard plate count of 1 50 000 colony forming units/ml. KAR

742 KARUWALLA (KR), NAKAHASI (HL) and QASBA (PK). Galactosyltransferase purified from rat milk is distinct from the human and bovine enzyme. **J. Dairy Sci. 69**(7); 1986; 1806-10

743 De CINDIO (B) and GRASSO (G). Regulation of the process of milk coagulation by measurements of thermal conductivity ("hot wire" method). Note 1. **Ind. Aliment. 25**(7-8); 1986; 541-8 (It)

On-line measurement of the thermal conductivity of coagulating milk (during cheese-making) enables one to distinguish clearly the end of the proteolytic stage, the start of the flocculation stage, and the progress of the hardening stage, and also to make some structural deductions. Among the conductivity models suggested for heterogenous materials, the one that seems to approach closest to the curdled structure is the semi-empiric mixed one, with structural elements both in series and in parallel, according to the thermal flux, and an experimentally deduced orientation factor, which gives the average orientation in respect of such directions. KMD

744 DEMEAUX (M), DESNOYERS (P) and LORIENT (D). Aptitudes of different milks to thermal treatment - validity of rapid methods for the measurement of stability. **Ind. Aliment. Agric. 103**(5); 1986; 279-86 (Fr)

Quick test methods, based on the measurement of ethanol or phosphate stability, have been used to determine the thermal stability of milk, and have been compared with the heat coagulation time at 140 C. A significant positive regression line between the heat coagulation time and ethanol stability or phosphate stability, as a function of pH, was always obtained. The slope of the regression line was not altered by the treatment, but the value of the intercept on the Y-axis was changed. Thus, quick test methods are not always suitable for the measurement of the stability of milk. KMD

745 DOUARD (D). Productivity in the milk industry. **Ind. Aliment. Agric. 103**(5); 1986; 359-60

746 DOUSSET (X) and LEVESQUE (A). Action of proteases of psychrotrophic bacteria of milk on the quality of milk products. **Ind. Aliment. Agric. 103**(5); 1986; 325-33

747 DUPUIS (Y), GAMBIER (J) and FOURNIER (P). Comparative study on the calcium bioavailability of milk, yoghurt, and processed cheese. **Sci. Aliment. 5**(4); 1985; 559-85 (Fr)

The bioavailability of Ca from (i) a partially skimmed milk, (ii) a yoghurt made with this milk along with powderedmilk, and (iii) from processed cheese (cream of Gruyere) was compared with that of the Ca from $CaCO_3$. The study was carried out with growing, aging and lactating rats. Ca utilization appears to be conditioned more by the composition of the diet than by the physiological state. When utilization factors are absent, bone turnover is increased. Inversely, the ingestion of lactose decreases the resorption of bone. Thus, during aging and lactation, the milk and yoghurt diets - both of which contain lactose - induce lowest bone exchanges. Some insufficiencies were observed with both processed cheese - (which contains added polyphosphates) and fresh cheese (without added polyphosphates) diets. Thus, lactose seems to be responsible for the differences observed in bone exchanges, arising from diets containing these different milk products. KMD

748 FORD (JE), SCHRODER (MJA), BLAND (MA), BLEASE (KS) and SCOTT (KJ). Keeping quality of milk in relation to the copper content and temperature of pasteurization. **J. Dairy Res. 53**(3); 1986; 391-406

Effects of pasteurisation temp. and variation in the natural Cu content of bulked herd milk on the rate of loss of milk ascorbic acid during refrigerated storage in light and in darkness, and on flavour stabhility were studied and some of the milks were analysed for 8 vitamins of the B-Complex. MVG

749 GOURSAUD (J). Biotransformations of lactose. **Ind. Aliment. Agric 103**(5); 1986; 349-57

Milk contains two stereo-isomers of lactose: α-hydrated, and β. The properties of milk products are determined by the form of lactose present in them. This review of the fermentative properties of lactose covers: (a) aerobic fermentation which is used industrially in the production of yeast and of bread; and (b) anaerobic processes which convert lactose into ethanol and methane. Lactic is a product that is prepared from lactose on an industrial scale. Hydrolysis of lactose - either chemically (using resins) or enzymatically - is coming into vogue. Some of the chemical derivatives can be used for animal or human feeding, or as sugar products of special dietetic value. KMD

750 KERJEAN (JR). Conductivity of milk: Biochemical significance of variations of electrical resistivity of mixed milks. **Ind. Aliment. Agric. 103**(5); 1986; 293-300 (Fr)

Measurements of electrical resistivity of milk are widely employed in the French dairy industry, while in Anglo-Saxon countries they are used to test mixed milks. The author has studied the causes of variation in the electrical resistivity of milk, and found it to be closely correlated to the content of chloride ions in the milk, and somewhat less closely to the pH, Ca content, ammonia content, and fat content. Electrical resistivity can also be used as a parameter for the testing of milks from cows affected by mastitis, and as an indicator of the aptitude of milk for different technological treatments. KMD

751 KERJEAN (J), DOUSSET (X) and BLAISE (P). Estimation of N-acetyl-glucosaminidase (Naz-ase) for the detection of mastitis in mixed milk. **Ind. Aliment. Agric. 103**(5); 1986; 273-6 (Fr)

This study shows that the correlation established (by kitchen on quarter milk) between the concn. of N-acetyl-glucosaminidase and the number of somatic cells (R=0.86) can be extended to bulk herd milk (R=0.78). this simple and rapid method would be a good method of screening bulk milks, of getting a better knowledge of commercial milks, and of controlling mastitis. KMD

752 LAVINE (ME), CLARK (RM), HUNDRIESER (KE) and FERRIS (AM). Within-day variation of lipolytic activity in human milk. **J. Dairy Sci. 69**(7); 1986; 1784-6

753 MANJI (B), and KAKUDA (Y). Thermal denaturation of whey proteins in skim milk. **Can. Inst. Food Sci. Technol. J.** 19(4); 1986; 163-6

Skim milk was subjected to various time-temp. treatments and the rates of denaturation of α-lactalbumin (α-LA) and β-lactoglobulin A and B (β-LG-A and β-LG-B) were monitored by Fast Protein Liquid Chromatography. The denaturation reaction appeared to follow first order kinetics for α-LA while both β-LG-A and β-LG-B followed second order kinetics. All three denaturation reaction showed a break in the Arrhenius plot at approx. 90°C. Equations were derived relating temp. (K^{-1}) to first order rate constant. $K_1(S^{-1})$or α lactalbumin or kinetic constants. $K_2(M^{-1}S^{-1})$ for β-LG-A and β^{1}-LG-B. Denaturation of β-LG-B was slightly more rapid than β-LG-A at temp. greater than 90° C. AA

754 MARZIALI (AS), and NG-KWAI-HANG (F). Effects of milk composition and genetic polymorphism on coagulation properties of milk. **J. Dairy Sci.** **69**(7); 1986; 1793-8

755 POLYCHRONIADOU (A) and VAFOPOULOU (A). Salt distribution between the colloidal and soluble phases of ewes' milk. **J. Dairy Res.** **53**(3); 1986; 353-8

756 SCURLOCK (PG). Production of cream from ultrafiltered milk. **J. Dairy Res.** 53(3); 1986; 431-8

Bovine whole milk was concentrated up to 5-fold by ultrafiltration and separated conventionally to produce protein enriched creams with fat contents ranging from 20 to 50% (w/w). The measured viscosity of the conc. increased with the degree of concn. This led to inefficient centrifugal separation as measured by the loss of fat into the skimmed milk, which was further worsened when damage to the fat globules occurred during ultrafiltration. The viscosity of the creams, at constant fat percentage, increased as the concn. factor of the milk from which it was separated rose. AA

757 SPANGELO (A), KARIJORD (O), SVENSEN (A) and ABRAHAMSEN (RK). Determination of individual free fatty acids in milk by strong anion-exchange resin and gas chromatography. **J. Dairy Sci,** 69(7); 1986; 1787-92

758 VEISSEYRE (R). On the evolution of milk processing technologies. **Ind. Aliment. Agric.** **103**(5); 1986; 342-4

759 WARNER (ME), PRATT (JE) and NOVAKOVIC (AM). Potential impacts of routing milk to dairy processing plants on the basis of assembly cost and protein content. **J. Dairy Sci.** **69**(7); 1986; 1972-86

Casein

760 BRINGE (NA) and KINSELLA (JE). Use of platelet aggregometer to monitor the chymos initiated coagulation of casein micelles. **J. Dairy Res.** **53**(3); 1986; 359-70

761 BRINGE (NA) and KINSELLA (JE). Influence of calcium chloride on the chymosin-initiated coagulation of casein micelles **J. Dairy Res.** 53(3); 1986; 371-9

762 MURTHY (GK) and PEELER (JT). Methods of sample preparation for detecting alkaline phosphatase in casein: Collaborative study. **J. Assoc. Off. Anal. Chem.** 69(4); 1986; 658-9

763 PEARSE (MJ), LINKLATER (PM), HALL (RJ) and MACKINLAY (AG). Effect of casein micelle composition and casein dephosphorylation on coagulation and syneresis. **J. Dairy Res.** 53(3); 1986; 381-90

764 POIFFAT (A) and ADRIAN (J). Nutritional characteristics of casein. **Ind. Aliment. Agric. 103**(5); 1986; 335-41

The casein micelle has a very exceptional physico-chemical composition. From the nutritional angle, its protein value is at least as good as that of meat. Moreover, it reinforces the biological efficiency of some micronutrients (like Ca, Fe, vitamin A...). It also modifies the cholesterol level of the organism. KMD

Cheese

765 DESNOUVEAUX (R), DRIOU (A) and LINDEN (G). Current status of the role of enzymes in the ripening and refining of cheese. **Ind. Aliment. Agric. 103**(5); 1986; 305-15

766 FLANAGAN (JF), SOMKUTI (GA), THOMPSON (MP) and HOLSINGER (VH). Preparation of cheddar cheese at elevated temperatures. **J. Dairy Sci. 69**(7); 1986; 1753-61

767 FEDRICK (IA), ASTON (JW), NOTTINGHAM (SM) and DULLEY (JR). The effect of a neutral fungal protease on cheddar cheese ripening. **NZ. J. Dairy Sci. Technol. 21**(1); 1986; 9-19

Neutral protease from **Aspergillus flavus** was studied with respect to proteolysis and flavour and texture in cheddar cheese during 6 months maturation at 10 C by adding protease at 0.001%, 0.005%, 0.01%, 0.025%, 0.05% and 0.1%. The optimum level of addition was 0.025-0.05%. KAR

768 GARDINER (MA) and PEACE (DM). Improved method for extraction of filth from cheese. **J. Assoc. Off. Anal. Chem. 69**(4); 1986; 712-3

769 MOHAMED (AA) and EL SAFTY (MS). Use of sweet whey to reconstitute non-fat dry milk for manufacturing Karish cheese. **Egypt J. Food Sci. 14**(1); 1986; 259-65

770 RETTI (G), MARIN (V) and ROCCO (S). Investigations on the microbiological characteristics of cheese produced in Venetian dairies. **Ind. Aliment. 25**(5); 1986; 386-90 (It)

The milk received in 15 dairies in the region around Venice, and the cheeses made in these dairies, were analysed for microbiological quality, with special attention to the presence of coliform and enterococci, as indicators of faceal pollution, as well as to organisms like **Staphylococcus** and **Salmonellae** which produce enterotoxins. The wide variability observed in the microbiological quality was due essentially to non-uniformity in the raw material received in these dairies, and also to variations in the processing pattern. Unripened, raw cheese had the highest pollution index, while short-ripened cheese showed only a small decrease in microbial load. The microbial load is low in freshly cooked cheese and in long-ripened cheese. A correlation could be observed between the microbial quality of the milk and of the final product. KMD

Milk Powder

771 DIRKS (U) and REIMERDES (EH). A rapid computer aided method for the determination of urea in dairy products-skim milk powder. **Z. Lebensmittel-Unters Forsch.** 183(2); 1986; 101-4 (De)

772 EL-NIMER (AA) and HELAL (FR). Coagulation of high and low heat skim milk powder properties of coagulae. **Egypt J. Food Sci.** 14(1); 1986; 247-51

773 STONE (DL) and EVANS (GF). Comparison of methodology for the determination of bacterial spore numbers in skim milk powder. **NZ. J. Dairy Sci. Technol.** 21(2); 1986; 139-44

Best estimate of thermophilic spore members was obtained after treating at 80 C for 30 min. Comparison of standard methods Agar (SMA) and starch agar (SA) for enumerating spores showed no significant difference in counts. KAR

Whey

774 REXROAT (TM) and BRADLEY (RL) Jr. Stability of concentrated, decolorized, deionized hydrolyzed whey permeate. **J. Dairy Sci.** 69(7); 1986; 1762-6

MEAT AND POULTRY

775 EGELANDSDAL (B), FRETHEIM (K) and SAMEJIMA (K). Dynamic rheological measurements on heat-induced myosin gels: Effect of ionic strength, protein concentration and addition of adenosine triphosphate or pyrophosphate. **J. Sci. Food. Agric.** 37(9); 1986; 915-26

776 LEPETIT (J) and SALE (P). Analysis of the rheological behaviour of meat by a sinusoidal compressive device. **Sci. Aliment.** 5(4); 1985; 521-540 (Fr)

The authors have analyzed the influence of both compression ratio and rate of strain on the rheological behaviour of raw meat, in order to give a better definition of the experimental conditions needed for meat texture evaluation. Seven muscles (with very different collagen contents) from seven animals were analyzed using the S.A.T.A. (sinusoidal compressive device of Sale **et al** (1984). The rheological behaviour of muscles was found to be greatly influenced by the compression ratio, and only slightly influenced by the strain rate. KMD

777 RENERRE (M) and MAZUEL (JP). Relationships between instrumental and sensorial measurement methods of meat colour. **Sci. Aliment.** 5(4); 1985; 541-58 (Fr)

Pork

778 ANON. Nitrogen factors for pork. **Analyst** 111(8); 1986; 969-73

A reassessment of the N factor (percentage N content) determined in 1961 for pork has been carried out. No evidence was obtained to suggest that the over-all factor of 3.45 (on a fat-free basis) was no longer applicable to the comminuted raw meat of a whole side, but significantly different factors were obtained for different joints. This study was carried out on a selected and limited group of pigs of the same sex, breed, mass and fatness and it is recommended that this work is followed by a more extensive survey. AA

779 SWATLAND (HJ). Pneumatic measurement of post-mortem setting in pork carcasses. **Can Inst. Food Sci. Technol. J.** 19(4); 1986; 167-9

780 SWATLAND (HJ). Colour measurements on pork and veal carcasses by fiber optic spectrophotometry. **Can. Inst. Food Sci. Technol. J.** 19(4); 1986; 170-73

Ham

781 CHIZZOLINI (R), MADARENA (G) and DAZZI (G). The meaning of water and protein content of cooked hams. **Ind. Aliment. 25**(7-8); 1986; 533-6 (It)

The quality of cooked hams has been evaluated on the basis of their chemical composition. As polyphosphates are difficult to assess in such meat products, it is suggested that other quality parameters such as moisture protein relationship and/or meat content would be more useful. AA ·

Rabbit

782 JULINI (M), BERTOLOTTI (PP) and VOGHERA (M). Current aspects of hare meat hygiene. **Ind. Aliment.** 25(5); 1986; 381-5 (It)

The authors have made a systematic study of hare (or rabbit) meat hygiene, paying particular attention to the chemical composition of hare meat, various methods of treatment and storage, and hygienic and qualitative aspects like pH-value, microbiological findings, ammonia content, and residues of anti-microbial agents. KMD

Salami

783 CANTONI (C), COMI (G), D'AUBERT (S) and BAVASTRO (GM). Dry salami alterations: Acid fermentation, softening and swelling. **Ind. Aliment. 24**(10); 1985; 791-5 (It)

Causative agents of acid fermentation, softening and swelling have been described . They are: lactobacilli spp (1) **Serratia liquefaciens** and **K. ozaenae** (2) and **Saccharomyces cerevisiae.** AA

784 DRAGONI (I), CANTONI (C) and SPADA (S). Black mouldiness on dry salami **Ind. Aliment.** 25(3); 1986; 219-22(It)

Black mouldiness of dry salami is caused by the overgrowth of **Penicillium stoloniferum.** AA

Sausages

785 COMI (G), CANTONI (C) and CELORI (F). Regards on coagulase negative staphylococci in the fermented sausages. **Ind. Aliment.** 25(5); 1986; 378-80 (It)

In this research, 270 Gram positive, catalase positive, coagulase negative, cocci were isolated from fermented sausages. The differentiation of strains revealed: 77% staphylococci, 33% micrococci, meanwhile the differentiation between staphylococci strains revealed: **Staph. xilosus** biotype 2.70%, **Staph. simulans** 7.2% **Staph. carnosus** 1.4%, atypical staphylococci 21.4%. AA

786 TIECCO (G), TANTILLO (G), FRANCIOSO (E), PAPARELLA (A) and NATALE (D). Research of some biogenic amines in the sausage during seasoning. **Ind. Aliment.** 25(3); 1986; 209-13 (It)

The AA show some biogenic amines present in the sausages during the seasoning. They have examined samples of sausages at short and at long period of seasoning, and the various amines shown were put in relation to the microbial growth. AA

Poultry

787 BAWA (AS) and HALEEM (MA). Tenderization of poultry meat. **Poult. Guide** 23(12); 1986; 83-90

The tenderness of poultry meat can be increased by treatment with enzymes. The authors have discussed various methods of enzyme application, their implications, effect on tenderness and chemical changes. A few areas where further research needs to be done have been indicated. KMD

788 LARSEN (JE), MACNEIL (JH) and MAST (MG). Sensory and quality characteristics of poultry frankfurters containing nitrite or sorbate. **Poult. Sci. 65**(8); 1986; 1542-6

In the triangle tests panelists were able to differentiate between nitrite and nitrite/sorbate frankfurters as well as between nitrate and sorbate treated frankfurters but not between nitrite-sorbate and sorbate frankfurters. On the hedonic scale of 1 to 9 for frankfurter flavour all treatments were rated as 5 neither like nor dislike. In the magnitude estimation tests for flavour, no differences were found among any of the treatments. However in colour tests under normal lighting the nitrite treated frankfurters were judged to have twice the amount of typical frankfurter colour as did the nitrite sorbate and sorbate frankfurters. From the magnitude estimation tests of texture, it was found that the inclusion of nitrite at either the 40 or 156 p.p.m. level in frankfurters had improved texture over the ones without nitrite. KAR

789 MARENZI (C). Proper meat storage prevents spoilage. **Poult. Guide. 23**(10); 1986; 57-60

Aspects discussed under meat spoilage prevention in poultry in refrigerated storage include: chilling; microflora causing spoilage; nature of substrates; temp., wrapping materials; and treatment with preservatives. Prediction of the residual storage life of poultry meat is possible by counting viable organisms, but this requires 48-72 h, the meat may already be spoilt by the time the results become available. Hence, direct microscopic examination of the stained smears from meat surfaces - which takes only a few min, but requires laboratory facilities - may be considered. KMD

Chickens

790 IBARRA (JJ) and YOKOYA (F). Estimation of chicken micjrobial load using the growth curve parameters of chicken microflora. **Poult. Sci. 65**(1); 1986; 58-66

791 NAGATA (T) and SAEKI (M). Liquid chromatographic determination of spiramycin residues in chicken tissues. **J. Assoc. Off Anal. Chem. 69**(4); 1986; 644-6

792 RENDEN (JA), OATES (SS) and REED (RB). Determination of body fat and moisture in dwarf hens with near-infrared reflectance spectroscopy. **Poult. Sci. 65**(8); 1986; 1539-41

The results of the study indicate that NIR spectroscopy is an effective alternative to standard chemical analysis of whole body fat and moisture content in chickens. However the calibration equations are dependent upon sample compositions, wave lengths, and instrument type. KAR

793 VALDES (EV) and SUMMERS (JD). Determination of crude protein and fat in carcass and breast muscle samples of poultry by near infrared reflectance spectroscopy. **Poult. Sci.** 65(3); 1986; 485-90

794 YOUNG (LL) and LYON (BG). Effect of sodium tripolyphosphate in the presence and absence of calcium chloride and sodium chloride on water retention properties and shear resistance of chicken breast meat. **Poult. Sci. 65**(5); 1986; 898-902

The sodium tripolyphosphate and especially tripolyphosphate (TP) + NaCl increased the water holding capacity and protein solubility of ground tissue. Calcium chloride reduced these effects if NaCl was absent. Intact muscle pieces that were marinated in TP or TP + NaCl absorbed more marinade than those that were marinated in H_2O. Pieces that were marinated TP solution had a greater cooked yield than those that were not. The TP-Heated pieces were more tender than those that were not treated with TP, but the differences were probably not greater enough to be of practical significance. KAR

Broilers

795 ANG (CYW) and HAMM (D). Effect of salt and sodium tripolyphosphate on shear, thiobarbituric acid, sodium, and phosphorus values of hot-stripped broiler breast meat. **Poult. Sci. 65(8)**; 1986; 1532-8

Hot stripped meat first infused with a marinade containing 1% NaCl, 3% sodium tripolyphosphate (STPP) and stored from 1 to 8 days at 2 C had reduced toughness as measured by force to shear (FS) and TBA values and were comparable to or lower than the FS and TBA values from meat conventionally processed and aged for 1 day. The combination of NaCl and STPP was most effective in reducing FS and TBA values followed by STPP, than NaCl and lastly H2O alone. KAR

796 LYON (CE) and WILSON (RL). Effects of sex rigor condition, and heating method on yield and objective texture of broiler breast meat. **Poult. Sci. 65**(5); 1986; 907-14

Prerigor samples heated in water gave highest yield. Both pre- and post-rigor samples heated via microwave exhibited greater yields than post-rigor samples heated in water. Microwave - heated samples required less force to shear than post rigor samples, and microwave-heated samples required, less force to shear than water heated samples. All of the objective texture attributes, except hardness, were significantly affected by rigor condition. KAR

797 SACKETT (BAM), FRONING (GW), DESHAZER (JA) and STRUWE (FJ). Effect of gaseous preslaughter environment on chicken broiler meat quality. **Poult Sci. 65**(3); 1986; 511-9

Animals were exposed to the environment of ammonia (25, 50, 75 and 100 p.p.m for 7 days), carbon dioxide (2500, 5000, 7500, and 10,000 p.p.m exposure for 7 days) and carbon monoxide (250, 500, 750 and 1000 p.p.m for 2 h) before slaughter. The results indicated that exposure to ammonia of 75 p.p.m., or $CO_2$of 5,000 p.p.m or greater, and carbon monoxide at 750 p.p.m. significantly increased breast muscle shear values. Breast muscle pH was significantly increased at all levels of CO_2 or 1000 p.p.m of $CO_2$and significantly decreased at 25 p.p.m of ammonia. KAR

798 SAMS (AR) and JANKY (DM). The influence of brine chilling on tenderness of hot-boned, chill-boned and age-boned broiler breast fillets. **Poult Sci. 65**(7); 1986; 1316-21

Brine chilling with 5% NaCl solution improved tenderness of hot boned fillets to the same level as that observed for fillets harvested from carcasses immediately after chilling but had no effect on fillets harvested postchill or after aging. KAR

799 VEERKAMP (CH). Fasting and yield of broilers. **Poult. Sci. 65**(7); 1986; 1299-304

The shrinkage and yield of processing and cut-up were estimated on 1296 broilers at various ages (36, 43 and 50 days). The shrinkage varied between 20 and 25%/h and depended on age. No significant differences were found in the percentages of shrinkage between male and female broilers. The yield values calculated as a percentage of the posthold live wt. were almost independent of holding time, if this time was greater than 4 h. The yield of the breast meat of broilers was increased by about 1%, and the yield of the legs was decreased by about the same amount, all other yield values were nearly the same as those from earlier experiments in 1981. AA

Turkeys

800 HOLMES (ZA). Comparison of meat quality between the right and left roasted turkey halves. **Poult. Sci.** 65(3); 1986; 497-500

801 KHANNA (N) and PANDA (PC). Studies on production of turkey pickle. **Indian J. Nutr. Diet.** 23(5); 1986; 137-41

Turkey pickle prepared by two methods [(i) cleaning, deboning and preparation of uniform chunks, precuring at 6 + 2 C for 3 days, cooking at 15 lb pressure for 30 min pickling at 25 C for 12 h and bottling the product for storage; (ii) uniform chunks prepared as in (i) cooking for 30 min at 15 lb pressure, pickling at 25 C for 12 h and storing after bottling was evaluated for chemical (protein, fat, moisture and ash) microbiological (total mesophilic count, total mold count, coliform count and faecal streptococcal count) and organoleptic changes during storage for 60 days. (i) gave better product than (ii). (i) could be stored for 60 days under ambient conditions without any adverse changes in chemical, organoleptic and microbial safety limits. BSN

802 PANDA (PC). Turkey and turkey products for consumers of India. **Poult. Guide** 23(10); 1986; 21-3

The author has presented brief notes on the following: half, quarter, and cut-up turkeys; canned turkeys; turkey paste; smoked turkeys; turkey roll; turkey sticks; turkey pickle; turkey meat block; and turkey cocktail sausage. KMD

803 PRUSA (KJ) and HUGHES (KV). Quality characteristics, cholesterol, and sodium content of turkey as affected by conventional, convection and microwave heating. **Poult. Sci.** 65(5); 1986; 940-48

Eggs

804 BELYAVIN (CG). Egg quality, important but not understood. **Poult. Guide.** 23(10); 1986; 49-54

This covers aspects including shell strength; shell colour; internal quality; age and shell strength; problems relating to flock; and management factors. KMD

805 BOSTEL (W). Quick test methods for evaluation of the hygienic status of egg products. **Getreide Mehl Brot.** 40(6); 1986; 184-6 (De)

The advantages of various rapid test methods may be listed as follows:- (1) The enzymatic method of determining the acid spectrum gives information on the quality of shell-eggs, in respect of age of the egg, (or incubated egg), and microbiological load (packed whole egg) as well as on the microbiological status of pasteurization. (2) The Limulus test gives information, even after pasteurization, about the uses of soiled eggs, as well as on the load of Gram-negative germs in liquid egg. (3) The germ count, by measurement of oxygen consumption gives information about actual microbial load at the time the test was performed (initial in-process control) and (4) The test for microbiological inhibitors gives information on the level of antibiotic and disinfectant residues in the egg. KMD

806 LEUENBERGER (U), GAUCH (R) and MULLER (U). Determination of piperazine in eggs by HPLC after oral administration. **Z. Lebensmittel Unters Forsch.** 183(3); 1986; 9092 (De)

807 ROLAND (DA). Egg shell quality. III: Calcium and phosphorus requirements of commercial leghorns. **World's Poult. Sci. J.**42(2); 1986; 154-65

This 3 part review covers reasons for difficulty in determining the hen's Ca requirement, excess Ca effect on feed consumption and egg production; importance of Ca in transition from pullet to layer feeds; P requirement; shell quality vs. reduced dietary P and min. P requirement for max. production. BV

808 ROLAND (DA). Egg shell quality. IV. Oystershell versus limestone and the importance of particle size or solubility of calcium source. **World's Poult. Sci. J.** 42(2); 1986; 166-171

This 4 part review covers comparison of large particles of oystershell with fine granular limestone; effect of oystershell on shell quality; comparison of larger particles of oystershell to similar sized particles of limestone, and varying responses of hens fed limestone vs. oystershell. BV

SEAFOODS

809 ANON. Biochemical effects of marine fish oils in a human subject. **Nutr. Rev. 44**(6); 1986; 205-7

810 CANTONI (C), CATTANEO (P), FABBRIS (F) and PRINA (G). Chlorinated hydrocarbon pesticides and PCB's in freshwater fishes. **Ind. Aliment. 24**(10); 1985; 808-9 (It)

The levels of chlorinated pesticides and PCB's of freshwater fishes, caughted in Italy, have been reported here. AA

811 FORNERIS (G), GIACCONE (V) and PARISI (E). Organochlorine compounds in some species of fresh-water fishes grown in bodies of water within the Turin region. **Ind. Aliment. 25**(6); 1986; 458-63 (It)

Muscular fat from 13 sp. of carp, salmon, and trout, growing in the rivers around Turin were analyzed for their content of PCB's, DDT and DDE, Aldrin, Dieldrin, Heptachlor, and Lindane. Polychlorinated biphenyls were found to be evenly distributed among these sp. Organochlorine pesticide residues were also measured, but were found to be within the limits permitted by Italian law. KMD

812 HANNA (RGM). Proximate composition of certain red sea fishes. **Egypt. J. Food Sci. 14**(1); 1986; 1-12

Nineteen sp. of 10 fish families inhabiting coral reef areas of coastal Egyptian Red Sea waters were studied for moisture, protein, fat and ash content of muscle and gonad. These parameters varied in value widely with a number of factors including age, sex, season and species. The fish samples were classified into five categories based on their fat-protein content, low oil - high protein, medium oil - high protein, high oil-low protein, low oil - very high protein and low oil - low protein. MVG

813 NEY (KH). 2,6-Dimethoxyphenol - the key flavour compound in smoke and smoked fish/meat products. **Gordian. 86**(6); 1986; 118 (De)

It is now known that 2,6-dimethoxyphenol is the key component of smoke used for the smoking of meat and fish products. The use of a mixture containing 2,6-dimethoxyphenol would make it possible to avoid the use of natural smoke which always contains carcinogenic benzopyrenes. KMD

814 PARISI (E), FORNERIS (G) and GLACCONE (V). Environmental heavy metal pollution: Fresh-water fishes as biological indicator. **Ind. Aliment.**

25(3); 1986; 214-8 (It)

The role of fresh-water fishes as biological indicator of environmental heavy metal pollution is briefly reviewed. In some specimen of various sp. (**Anguilla anguilla, Salmo gairdneri, Salmo trutta, Salmo trutta marmoratus, Leuciscus cephalus cabeda** and **Leuciscus souffia muticellus**) the contents of the most important heavy metals dangerous for man (Pb, Cd, Cr, As, Mo, Ni, Co, Cu, Mn, Sb, Sn, Te, TI, V) was determined spectrophotometrically. In edible parts of fishes could be found traces of Ni and Mo a high content of Cd (0.06 p.p.m an average) and Cr (0.41 p.p.m an average) and amounts of Pb that were lower as those expected (0.09 p.p.m. an average) AA

815 SHEREKAR (SV), DOKE (SN), GORE (MS) and NINJOOR (V). Proteinases of tropical fish and their role in autolysis. **Indian J. Exp. Biol. 24**(7); 1986; 440-44

Presence of proteolytic enzymes, viz. cathepsins A, B, D, alkaline proteinase and arginine naphthylamidase was demonstrated in the muscle extracts of four tropical fish var. fresh water fish (**Tilapia mossambica**), Bombay duck (**Harpodon nehereus**), white pomfret (**Stromateus cinereus**) and shrimp (**Penaeus indicus**). In shrimps, cathepsin B could not be detected. Using specific inhibitors, involvement of proteolytic enzymes in the autolysis of two fish sp. was investigated. At low pH cathepsin D was responsible for protein degradation, while at pH 6.5 participation of cathepsin B was evident. In **Tilapia**, proteolysis at pH 5.5 was mediated by both cathepsins B and D. AA

Diplacanthopoma nigripinnis

816 DHANANJAYA (S), KRISHNA KUMAR (S) and HIREMATH (GG). Acceptability and frozen storage stability of deep sea fish **Diplacanthopoma nigripinnis** (Gilchrist and Von Bonde). **Seafood Exp. J. 18**(8); 1986; 17-9

The authors have reported a study on **Diplacanthopoma nigripinnis** Gilchrist and Von Bonde, caught off Mangalore (S.W. Coast of India) at 80-300 m depth, frozen on board at -28 C, packed in corrugated cartons, and stored at -20° C. The changes occurring during 6-month frozen storage have been reported. The peroxide value increased from 0.57 m mol. O_2/kg fat to 3.00 m. mol. O_2/kg fat, while the salt soluble N decreased from 81.19% to 53.10% of total N. The length and wt. of the fish were, 17.53 cm and 24.77 g resp.; dressed yield was 53.26 % and picked meat yield was 30% of live wt. The proximate composition was: moisture 81.03%, protein 16.75%, fat 0.45% and ash 3.74%. In general, this sp. has the properties of any other lean fish, and may be processed into fish sausage. KMD

Sardines

817 SUDHAKARA (NS), NAGARAJ (AS) and SETTY (TMR). Economics of a batch type wet reduction method for oil sardines. **Seafood Exp. J. 18**(9); 1986; 10-13

The economics of small units producing fish meal and fish oil from oil sardines has been worked out and the layouts have been shown diagramatically. The capital investment for a unit processing 50 and 75 t/yr works out to Rs. 28,200 and Rs. 40,400 resp., and the working capital required is Rs. 53,000 and Rs. 79,500 resp.; the nett profit earned comes to Rs. 22,504 and Rs. 35,113 resp. KMD

Shrimps

818 VENUGOPAL (TN). Thaw drip loss in frozen shrimps. **Seafood Exp. J. 18**(8); 1986 7-9; 11

Drip losses in frozen, peeled deveined Indian shrimps, and undeveined Indian shrimps - belonging to five sp., varied between 8.6 and

15.8%. Max loss occurred in meat from **Parapenaeopsis stylifera** and **Acetus indicus** (11% and 13.5% resp. on an av.); the av. loss in **Metapenaeus monoceros** and **Penaeus indicus** was 10.6 and 10% resp; the least drip loss was in meat from sp. **Metapenaeus dobsoni** (9.5% on an av). Factors other than sp. which affect drip loss and some measures for their prevention have been mentioned. KMD

PROTEIN FOODS

819 SOLANKI (S). Formulation and shelf life study of malted ready-to-eat (RTE) mixes. Part I. **Indian J. Nutr. Diet. 23(2), 1986 35-40**

Five ready-to-eat (RTE) mixes (i) malted wheat (MW) + malted Bengal gram (MB); (ii) MW + MB + roasted groundnuts; (iii) MW + MB + malted groundnuts; (iv) MW + MB + roasted gingelly seeds; and (v) MW + MB + malted gingelly seeds) have been prepared and studied for their keeping quality and chemical composition. Protein content of these mixes varied from 10.38 to 11.99 g/100 g mix, while energy content K cal varied from 355-383/100 g mix. The RTE mixes had a shelf life of 42 days. BSN

820 SOLANKI (S). Organoleptic evaluation of malted ready-to-eat (RTE) mixes on aged women (50-80 years). Part II. **Indian J. Nutr. Diet. 23(3)**, 1986, 69-72

Five ready-to-eat (RTE) mixes as mentioned in the previous paper were organoleptically assessed by 270 aged women (50-80 y). Mix (iv) was ranked best, followed by (i), (ii), (iii) and (v) resp. by the judges based on scores. All the five mixes in general were acceptable as they showed > 60% of max. score. (For Part 1 see the previous abstract). BSN

FRUIT JUICES AND BEVERAGES

Fruit juices

821 DITTRICH (HH). Possible effects of micro-organisms on fruit and vegetable juices. **Flussiges Obst.** 53(6); 1986; 320-23 (De)

Microorganisms that cause spoilage of fruit and vegetable juices are mainly yeasts, lactic and acetic acid bacteria, and moulds. The number of substances that indicate spoilage is, however, much greater. Max. limits for these spoilage indicating substances have been laid down only for the most important juices. KMD

822 BUCHNER (N). Symposium on "Aseptic Glass Filling" at ROBERT BOSCH GmbH Korntal-Munchingen. **Flussiges Obst.** 53(9); 1986; 463-5 (De)

An abridged version of the key-note paper by Prof. Dr.N.Buchner has been published here. It contains a discussion of the past, present and future of aseptic packaging and describes a pilot plant for the aseptic filling of liquid foods into glass containers. KMD

Apple juices

823 COPPOLA (ED) and STARR (MS). Liquid chromatographic determination of major organic acids in apple juice and cranberry juice cocktail: Collaborative study. **J. Assoc. Anal. Chem.** 69(4); 1986; 594-7

Cider

824 KLITTA (E). Cider fruit growing for industrial processing, seen from a practical point of view. **Flussiges Obst.** 53(6); 1986; 284-90 (De)

Growing of cider fruit is profitable for those units which can use their existing machines and equipment without additional investments. If the units can sell their products themselves (i.e. if they have a distillery and cider fruit processing plant) they may well increase their income. Speaking generally, one may say that new orchards are quite justifiable in view of the decreasing trend in the number of cider fruit trees from year to year. KMD

825 RANA (RS), VYAS (KK) and JOSHI (VK). Studies on the production and acceptability of cider from Himachal Pradesh apples. **Indian Food Packer.** 40(6); 1986; 48-55

Ciders were prepared from fresh apple juice by fermenting at 20, 25 and 30°C and with a SO_2 concn. of 50, 100 and 150 p.p.m.. Fermentation was completed in 12, 10 and 9 days at 20, 25 and 30° C resp., flavour was slightly better for those fermented at 20 and 25°C. Addition of 50 p.p.m. of SO_2 prevented browning and gave cider of desirable colour and flavour. Providing additional N as 0.1% diammonium hydrogen phosphate was not necessary. Organoleptic evaluation by taste panel revealed that cider containing 5% alcohol with soluble solids/acid ratio of 25 was most favoured. Majority of the panel members opted for packing in 200 ml bottles. KAR

Orange juice

826 GALENSA (R), ARA (V) and SIEWEK (F). Investigations on the content of naringin in orange juice. **Flussiges Obst** 53(9); 1986; 454-6 (De)

The presence of grapefruit juice in orange juice can be detected by testing for naringin, a flavonoid compound found in grapefruits and not in oranges. But some Israeli investigators have pointed out the naringin appears to be present in small quantities in Israeli oranges. Careful tests were done with Israeli oranges of the "Shamouti" and "Valencia" var. Naringin was not detected in the juice, nor even in the albedo and peel. The albedo and peel did contain large amounts of hesperidin and marirutin. Naringin could not be detected in oranges from Morocco, Italy, Spain, and Greece either. Some aspects of the analytical method have also been discussed. KMD

827 HOFSOMMER (H-J). Italian orange juice concentrates - Processing and analytics. **Flussiges Obst.** 53(6); 1986; 290-300 (De)

This comprehensive review of the Italian orange juice conc. industry covers: 1) location; 2) harvested quantities; 3) varieties; 4) technology; 5) conc. market, and 6) quality evaluation or analysis, including authenticity, acids, sugar, mineral components, and special compounds like hesperidin and pectic substances. KMD

828 MOHSEN (SM), EL-HASHIMY (FSA) and GAWAD (AA). Effect of concentration methods on orange juice properties and its volatile components. **Egypt. J. Food Sci.** 14(1); 1986; 191-204

829 LAFUENTE (B). Factors affecting the quality and stability of semi-processed orange juice. **Flussiges Obst.** 53(6); 1986; 304-9

830 WALLRAUCH (S). Mono-galacturonic acid and pectin in orange juice (citrus juice) - Significance in evaluation. **Flussiges Obst.** 53(9); 1986; 448-53 (De)

The content of free galacturonic acid in orange juice ranges from 50 to 170 mg/l. Values in excess of 200 mg/l may indicate an enzymatic degradation of pectin, which may be caused, e.g., by decayed fruits. As the skins of spoiled fruits often cannot be removed cleanly, a high galacturonic acid content may frequently be accompanied by a high proportion of water-soluble pectins. Such an orange juice no longer conforms to the existing directives on fruit juices. Free galacturonic acid is determined after eliminating the interfering compounds by means a strongly basic anion exchanger and carbazol. The working procedure for this analysis has been reported. KMD

Coffee

831 ANAND ALWAR (RP) and RAMAIAH (PK). By-products of coffee berries and their possible utilisation. **Indian Coffee. 50**(6); 1986 3-8

The uses of coffee pulp as animal feed, or as organic manure, or for production of biogas (methane), or for production of charcoal briquettes after sun-drying have been outlined. The mucilage could be used for production of pectin, or vinegar. Coffee husk and parchment can be used for production of furfural, or for recovery of coffee aroma that can be used in blending. Finally, spent coffee grounds can be used for extraction of coffee oil, or for production of furfural. KMD

832 ANON. Coffee and health - A report. **Indian Coffee. 50**(10); 1986; 9, 19

The Committee on the physiological effects of coffee, which met in Zurich, Switzerland on 15th Oct. 1986 has in a statement stressed that "the bulk of scientific evidence does not suggest that coffee drinking is a risk factor in the development of heart disease. Long-term studies that take into account all the recognized risk factors such as stress and diet.will have to be undertaken to settle the question finally. KMD

833 DALLA ROSA (M), BRABANTI (D) and NICOLI (MC). Production of roasted coffee with high yield. 2. Quality of the extract. **Ind. Aliment. 25**(7-8); 1986; 573-540 (It)

By roasting coffee at high temp. for a short time (224-268 C for 1.5 to 3.0 min.) it is always possible to obtain a roasted coffee of low density. When it comes of extraction, "High Yield" roasted coffees always give a higher yield than coffees roasted in conventional machine, and the acidity of their extract is also slightly higher. KMD

834 KITTS (DD). Competitive binding of phytoestrogens in coffee extracts with 17 -estradiol to uterine cytosol receptors. **Can. Inst. Food Sci. Technol. J. 19**(4); 1986; 191-4

835 MAYANNA (SM) and JAYARAM (B). Oxidimetric estimation of caffeine using aromatic sulphonyl haloamines. **J. Indian Chem. Soc. 63**(3); 1986; 329-31

Simple titrimetric methods for the assay of caffeine with N-haloamines [dichloramine-T (DCT), bromamine-T (BAT), dibromamine-T (DBT), chloramine-B (CAB), dichloramine-B (DCB) and bromamine-B (BAB)-] have been developed for the estimation of caffeine. In this method a known vol. of 0.05 N oxidant is reacted with aliquots of caffeine in an iodine-flask, containing sufficient amount of acid or base (buffer of pH 2 for CAB, 0.025 - 0.5 M NaOH for BAT, 0.05 - 1.0 M NaOH for BAB and 25 ml of 50% acetic acid for dihalomines). After 30 min, 3 M sulphuric acid (20 ml) was added along with 10% KI (10 ml) and the liberated iodine estimated using standard thiosulphate solution (0.01 N). Blank experiment was conducted at each time and the amount of caffeine in the sample solution estimated. Details of the procedure for the application of this method for the assay of caffeine in medicinal formulations, instant coffee and tea, soft drinks and alcoholic beverages are given. KAR

Beer

836 BUCKEE (GK). Automation of brewing analyses - A review. J. Int. **Brew.** 92(4); 1986; 323-9

Discusses: Automated methods used in quality control lab. continuous flow analysis head retention values; carbon dioxide; total N; near-infrared analysis, miscellaneous methods; in-line analysis, pH; oxygen; carbondioxide; clarity; original gravity and density; miscellaneous measurements; and outlook. BSN

837 GLENNIE (CW) and WIGHT (AW). Dextrins in sorghum beer. J. Inst. **Brew.** 92(4); 1986; 384-6

Dextrins containing from 4 to 10 glucose units were determined in sorghum malt, wort and beer by means of HPLC. Throughout a malting period of 10 days approx., 5% fermentable sugars and only trace amounts of dextrins could be detected and the pattern remained constant. During mashing, using maize adjunct and at pH 4, there was a rapid build-up of a wide range of dextrins but their content was greatly reduced during the final stages of mashing. Both sorghum and barley beer contained similar amounts of dextrins containing 4 to 9 glucose units. The majority of these dextrins was branched as their concn. was reduced to a great extent by the action of pullulanase. Dextrins containing more than 10 glucose units were detected and their concn. was also diminished by pullulanase. AA

838 LLOYD (WJW). Adjuncts. J. Inst. **Brew.** 92(4); 1986; 336-45

Discusses: production and use of starch rich adjuncts; technical considerations; general calssification of brewing adjuncts; analytical characteristics of starch rich bearing materials; influence on brewing operations and beer quality; analytical characteristics of sugar rich brewing adjuncts; and evaluations and innovation. BSN

839 NARZISS (L). Technological factors of flavour stability. J. Inst. **Brew.** 92(4); 1986; 346-53

Discusses: Changes of beer aroma; oxygen content of bottled beer, carbonyls and beer aging; oxidation during wort production and effect on beer aging; causes for oxidation during mashing; analysis of beers; aeration of Lauter wort at 70 C; comparison of beers, wort boiling trials with and without access of classification of wort during lautering or during trub separation and the effect of heat. BSN

840 OGDEN (K). Nisin: A bacteriocin with a potential use in brewing J. Inst. **Brew.** 92(4); 1986; 379-83

841 REED (RJR) and FORREST (IS). Performance of a steam eductor in a pilot brewery. J. Inst. **Brew** 92(4); 1986; 370-78

Steam eductors have the potential for reducing the demand for steam during the evaporation of wort by up to 50% with low capital expenditure and without affecting the process of wort boiling or the flavour of beer. The theory-describing the operation of eductors is discussed together with sample calculations for the prediction of performance. A small unit was installed on a kettle in the Holyrood pilot brewery to demonstrate the practicality of the principle and to obtain experience in operation. The unit performed in a manner in keeping with theory and had an efficiency of 90%. There is a great likelihood that the economic advantage of steam eductor systems will be very close to theoretical prediction. AA

Malt

842 HENRY (RJ) and BLAKENEY (AB). Determination of total -glucan in malt. **J. Inst. Brew.** 92(4); 1986; 354-6

843 MARTIN (PA) and CANTRELL (IC). The use of the friabilimeter to determine malt modification and homogeneity. **J. Inst. Brew.** 92(4); 1986; 367-9

The Analysis Committee has tested collaboratively the Friabilimeter of Kretschmer and Chapon for the detn. of malt modification. The version of the method in which friability is determined by measuring the residue remaining in the Frabilimeter drum has been approved for inclusion in the Recommended Methods of the Institute of Brewing. The development of the method, advanced by Baxter and O'Farrell for the measurement of homogeneity, has also been recommended. AA

844 SMITH (DB) and GILL (AA). Quantitative changes in the concentrations of the major components of four genotypes of barley grains during malting and mashing. **J. Inst. Brew.** 92(4); 1986; 360-66

Four genotypes of barley including good and poor malting var. were sampled as grain, green malt, kilned malt and spent grains. Each of these samples were analysed for total protein, aggregated protein, total and soluble β-glucan, starch and husk contents. Protein sub-units were separated using sodium dodecyl sulphate polyacrylamide electrophoresis. Activities of β-glucanase, endopeptidase and β-amylase were measured and starch from each sample was purified and separated into large and small granules and analysed for total protein and sub-unit protein content. Results calculated as % of dry wt. and as a proportion of the wt. of dry grain showed quantitatively the changes which occurred in the components of the grain during malting and mashing. Comparisons of the composition of the genotypes at the various stages showed that the best malting var. studied. Ark Royal, was better because of moderate superiority in several characters rather than a fundamental difference in a single attribute and supports the thesis that to further improve malting quality plant breeders should select for several characters which are independently inherited. AA

Worts

845 HALSEY (SA). The application of transmission near infrared spectroscopy to the analysis of worts. **J. Inst. Brew.** 92(4); 1986; 387-93

Transmission near IR spectroscopy has been evaluated for the analysis of 'laboratory' worts. Good agreement between manual and NIR methods has been obtained for Hot Water Extract and total carbohydrates. Satisfactory calibrations have been developed for fermentable sugars, fermentability and free alpha-amino N. No sample preparation was required. Hence, this technique provides a rapid and non-destructive method for measuring all these parameters simultaneously. AA

846 MIEDANER (H). Wort boiling today-old and new aspects. **J. Inst. Brew.** 92(4); 1986; 330-35

Discusses: Objectives of wort boiling; methods and systems of wort boiling; physical and chemical changes during wort boiling; utilization; additional changes and interactions during wort boiling; dimethylsulfide and wort boiling; formation of volatile Maillard products; and evaporation of volatiles. BSN

Wines

847 BARILLERE (JM), DUBOIS (C) and BIDAN (P). Thermal resistance of strains of yeasts isolated from wines. 2. Theories of heat resistance-mathematical models. **Sci. Aliment.** 5(4); 1985; 607-17 (Fr)

848 BAUMES (R), CORDONNIER (R), NITZ (S) and DRAWERT (F). Identification and determination of volatile constituents in wines from different wine cultivars. **J. Sci. Food. Agric.** 37(9); 1986; 927-43

Wines from five white vine cv. and from five red vine cv. were analysed using standard liquid-liquid extraction, chemical fractionation, adsorption chromatography on silica gel, low-and high-performance gas - liquid chromatography and gas chromatography - mass spectrometry. 122 substances were positively identified; 14 of them have not been identified so far in wine. KAR

849 ROSINI (G). Wine-making by cell-recycle-batch fermentation process. **Appl. Microbiol. Biotechnol.** 24(2); 1986; 140-43

Adoption of cell-recycle-batch fermentation process in wine making caused a reduction of the fermentation length as well as in improvement in ethanol productivity and yield and can be applied in the production of table wines. KAR

850 RUPPERT (JR). Automated determination of ethanol and wine extract with precision density meter, automatic sampler, and programmable calculator. **J. Assoc. Off. Anal. Chem.** 69(4); 1986; 709-11

851 SUBDEN (RE), AKHTAR (M) and CUNNINGHAM (JD). The effect of activated carbon stripping on the mono and divalent cations and transition metals of wine. **Can. Inst. Food Sci. Technol. J.** 19(4); 1986; 145-7

In the wine industry, "charcoal" (activated carbon) is at times used to decolourize musts and wines or to remove organic mol. associated with undesirable odours or flavours. A red wine was spiked with some relevant cations and transition metals then treated with various amounts of activated carbon. The activated carbon decolourized the wine, decreased iron and copper concn. increased sodium concn. and produced only minor changes in the K, Ca and Mg conc.

OILS AND FATS

Oils

852 PALLAVI MEHATA, ASHA PATIL and BUJUTA HERLEKAR. Assessment of suitability of various oil blends for culinary purposes. **Indian J. Nutr. Diet.** 23(5); 1986; 126-31

The study deals with evaluation of blended oils: (i) groundnut oil + rapeseed oil (50:50) GRO; (ii) groundnut oil + cotton seed oil (50:50) GCO; (iii) rapeseed oil + cotton seed oil (50:50) RCO and (iv) groundnut oil (GO)) for the preparation and acceptability of a typical Gujarati diet (**puri**, vegetable, dhal chola, **batakavada**, **muthia**) and also the acceptability and shelf life of mango pickles prepared by using blended oils by studying the physical, chemical and organoleptic (peroxide value, (PV), free fatty acid (FFA), taste, texture and colour) parameters. GCO was better than GO from organoleptic scores ($P < 0.05$). PV was highest in mango pickle prepared from GCO, while FFA showed an increase in each case ($P < 0.05$). During intgermittent frying initially and after four months, RCO developed a lower PV on storage than was in case of GCO and GRO. GO showed higher PV than GCO, GRO, and RCO. All the blends at the end of initial frying showed FFA increase ($P < 0.05$). BSN

853 WELLING (P) and KAANDORP (B). Determination of polycyclic aromatic hydrocarbons (PAH) in edible vegetable oils by liquid chromatography and programmed fluorescence detection. **Z. Lebensmittel Unters Forsch. 183**(2); 1986; 111-5

Coconut oils

854 HASLBECK (F), WIESER (H), STEMPEL (W) and GROSCH (W). Studies on fat deterioration by lipolysis. II. Odour and taste of fatty acids in cream and coconut oil. **Z. Lebensmittel-Unters. Forsch 183**(2); 1986; 93-6 (De)

For the evaluation of flavour defects caused by lipolysis, taste and odour thresholds of even-numbered fatty acids (4:0 to 14:0 were determined in cream, coconut oil and in aromatized coconut oils. The content of endogenous fatty acids which amounts up to 15% of the threshold values, was taken into account. The odour thresholds of butyric acid and caproic acid are always lower and those of caprylic to myristic acid are higher than the taste thresholds; this observation was especially pronounced in coconut oil. The aromatization of coconut oil with vanilla or nutty flavours leads to an appreciable increase of the fatty acid thresholds. Synergistic effects of fatty acid mixtures (4:0 to 12:0), added in subthreshold amounts, cause a rancid-soapy aroma defect. AA

Palm oils

855 FANGUIN (J). Yields in palm oil mill kernel recovery stations. **Oleagineux; 41**(6); 1986; 287-90

The results appearing in this study were obtained from a palm oil mill with a 20 t of fruit/h processing capacity. These results are specific to the oil mill in question and cannot therefore be directly extrapolated for other cases without caution. These results can be expressed as follows: 1 -3.40% loss of kernels for each 1% of kernel in the fibres of the cyclone fibre separator; 2- 2.28% loss of kernels per kg of fragments lost in the polisher rotary screen (per tonne of bunches); 3 - 0.58 % loss of kernels for each 1% of kernel in the dust of the cyclone dust remover; 4 - 0.60% loss of kernels for each 1% of kernel in the shells leaving the hydrocyclone. AA

856 OKIY (DA) and OKE (OL). Nutritional evaluation of thermally deteriorated palm oil. **Oleagineux. 41**(2); 1986; 77-81

Cassava-leaf protein diets were supplemented with either fresh unheated palm oil, heated plain palm oil, heated palm oil containing 1% pepper or heated palm oil containing 1% table salt and fed to test rats. PER, NPU, TD and BV were measured to test the effect of thermally deteriorated palm oil on the protein. Although the TD of the diet supplemented with fresh palm oil was significantly greater than that of the control and those of the diets supplemented with plain and pepper-treated samples of heated palm oil, the former was similar to the TD of the diet supplemented with salt-treated sample of heated palm oil. The other parameters such as PER, NPU and BW did not differ significantly in all the diets, thus signifying that the thermally deteriorated samples of palm oil did not effect irregularities in the diets of this study. AA

Fats

857 NAGAMALLESWARI (K), SHYAMALA DEVI and SHANMUGASUNDARAM (ERB). Nutritive value of mixed fats. **Indian J. Nutr. Diet. 23**(10); 1986; 299-302

The nutritive value and biochemical aspects of Sal (**Shorea robusta**) fat was studied by feeding (i) alone or mixed with (ii) palm oil or (iii) groundnut oil in 1:1 ratio and compared with those fed

(iv) palm oil or (v) groundnut oil alone at 10% (w/w) level. Melted oil was delivered to the stomach at a dosage of 400 mg/1000 sq. cm surface area. The coeff. of digestibility was 84 for (i), 92 for (ii), 91 for (iii), 95 for (iv) and 94 for (v). The AT50 value for (i) was highest (378 min)and was 363 min for (ii) and 370 min for (iii). Hydrolysis was lowest for Sal fat followed by the fat mixtures. KAR

SPICES AND CONDIMENTS

Fenugreek

858 SHARMA (RD). An evaluation of hypocholesterolemic factor of fenugreek seeds **(T. Foenum graecum)** in rats. **Nutr. Rep. Int.** 33(4); 1986; 669-77

Fenugreek and its fractions when added to a diet caused hypocholesterolemia in rats. Fenugreek significantly prevented the rise in serum cholesterol in rats fed on a hypercholesterolemic diet. Among the fenugreek fractions, lipid extract and trigonelline had no such effect, while the defatted fractions, gum isolate and the crude saponins showed hypocholesterolemic activity. Substitution of hypercholesterolemia inducing diet with fenugreek for 4 wk significantly reduced ($P < 0.001$) the elevated cholesterol levels. In contrast, triglyceride levels were not affected. AA

Mango pickles

859 VERMA (RA), TRIPATHI (VK), TRIPATHI (MP) and SURJEET SINGH. Studies on the effect of packaging materials on mango pickle during storage. **Indian Food Packer. 40**(6); 1986; 22-5

Mango oil pickle was packed in (i) glass jars, (ii) A 2 1/2 cans (iii) open top friction container along with polyethylene bags (iv) polyethylene container (HDPE), and (v) polyethylene bags (LDPE) of 300 guage; and stored at ambient temp. (30 + 5 C) for 6 and 12 months after which analysed for pH, acidity, ascorbic acid content, sugars, browning, rancidity, and organoleptic quality. As the storage period increased the ascorbic acid, sugars, protein, P and tyrosine content decreased. The pH, browning and rancidity showed increased trend. Rancidity was max. in (v). (iv) gave comparatively stronger off flavour. Pickle stored in (ii) had no bad smell and retained better colour; it was very soft and mashy in texture. Pickles stored in (i) scored highest even after 12 months storage and was of superior quality. Due to strong rancid odour and dull colour others were not found satisfactory. KAR

SENSORY EVALUATION

860 HOFFMANN (H). Malodor control-A review. **Perfume. Flavor. 11**(3); 1986; 1-8

This review discusses briefly about malodor, alfaction and olfactory systems, perception of odourant mixtures; malodor control; and practical applications. BV

861 LAWLESS (HT) and MALONE (GJ). The discriminative efficiency of common scaling methods. **J. Sensory Stud.** 1(1); 1986; 85-98

Four types of rating scales, nine-point category scales, line marking, magnitude estimation, and a hybrid of the category and line scale, were employed to assess visual, tactile and olfactory characteristics of products by consumers. The scales were compared for their ability to discriminate differences among products, for variability, for reliability, and for ease of use. All methods were able to generate highly significant differences among products. However, a modest advantage for category scales was observed in almost all comparisons. AA

862 PEARCE (JH), KORTH (B) and WARREN (CB). Evaluation of three scaling methods for hedonics. **J. Sensory Stud.** 1(1); 1986; 27-46

A collaborative study of twenty-three lab. was conducted to compare the relative effectiveness of three scales: two forms of magnitude estimation scaling and one form of a category scale in the measurement of hedonic response to a controlled stimulus. Responses from 553 individual judges show that all scales yield hedonic measurements that are very similar in both direction and magnitude of difference between the stimuli. No scale showed any clear superiority in reliability, precision, or discrimination. Selection of a scale must be based on considerations other than the simple form of response. AA

FOOD STORAGE

863 LE PATOUREL (GNJ). The effect of grain moisture content on the toxicity of a sorptive silica dust to four species of grain beetle. **J. Stored Prod. Res.** 22(2); 1986; 63-9

The toxicity of a sorptive silica dust in samples of whole wheat to adult populations of **S. granarius**, **T. castaneum**, **C. pusillus** and **O. surinamensis** was assessed at grain moisture contents between 9.4 and 18.7%. The tolerance of these species to the dust treatments was found to increase with increasing moisture content and to be unrelated to their relative abilities to survive short periods at low relative humidities when provided with food. AA

864 ROY (SK) and KHURDIYA (DS). Studies on evaporatively cooled zero energy input cool chambers for the storage of horticultural produce. **Indian Food Packer.** 40(6); 1986; 26-31

Evaporative cooling zero energy input cool chambers were developed using materials like brick, sand, bamboo and gunny bag. Once they are saturated with water sprinkling of water twice a day maintained an inside temp. of -23 C when outside temp. was 43 C, and a RH of 95%. In these chambers the shelf life of green vegetables increased to 3 days (<1 day for outside) and for other vegetables 6 days compared to 1-3 days outside the chamber. The physiological loss in wt. was also less in the cool chambers for all the greens and vegetables. Cool chamber also helped in retaining the anthocyanin content of fruit juice and nectar even during storage for 8 months. KAR

865 SHAZALI (MEH) and SMITH (RH). Life history studies of externally feeding pests of stored sorghum: **Corcyra cephalonica** (Staint) and **Tribolium castaneum** (Hbst). **J. Stored Prod. Res.** 22(2); 1986; 55-61

The optimal conditions for multiplication of **C. cephalonica** were found to be 30°C and 60-80% R.H. while **T. Castaneum** the optimal temp. was 35°C at the same range of humidity. However humidities (40 and 50% R.H) had a small adverse effect on both species. KAR

866 SMITH (JS) Jr. Semi-underground storage model for peanuts. **Oleagineux** 41(4), 1986, 195-7

A semi-underground storage facility was designed and constructed at the National Peanut Research Laboratory, Dawson, Georgia, with a capacity of 10.2 m^3 for studying storage of farmers stock peanuts underground. The facility was instrumented with thermocouples and relative humidity sensors to monitor the temp. and relative humidity at various locations within and adjacent to the facility throughout the storage season. Observations from the first year's study and the use of this facility in future peanut storage research are discussed. AA

867 THAUNG (M) and COLLINS (PJ). Joint effects of temperature and insecticides on mortality and fecundity of **Sitophilus oryzae** (Coleoptera: Curculionidae) in wheat and maize. **J. Econ. Entomol.** 79(4), 1986, 909-14

Sitophilus oryzae (L) were added to maize and wheat either untreated or treated with low doses of either fenitrothion or cypermethrin. Replicates were held at 22, 25, and 30 C. Adult mortality and fecundity were recorded at weekly intervals for 3 wk. Toxicity of fenitrothion to **S. oryzae** adults increased with increasing temp. on both maize and wheat, whereas toxicity of cypermethrin decreased with increasing temp. At each temp. with both insecticides, mortality was higher and demographic performance (l v) was lower on maize than on wheat. Population suppression on maize measured as changes in rm and R was positively correlated with temp. for cypermethrin. On wheat, however, population growth changed very little with temp. change. Over the dose range studied, the increased demographic performance of **S. oryzae** on wheat was sufficient to compensate for increased adult mortality with increasing temp. AA

INFESTATION CONTROL AND PESTICIDES

868 CHANDRAKANTHA (J) and MATHAVAN (S). Changes in developmental rates and biomass energy in **Callosobruchus maculatus** (F.) (Coleoptera:Bruchidae) reared on different foods and temperatures. **J. Stored Prod. Res.** 22(2); 1986; 71-5

The growth rate of **C. maculatus** was faster when reared on stored seeds of **Vigna unguiculata** (cow pea) followed by **V. radiata** (green gram) and **Dolichos lab lab.** (bean). Larval periods were longer when **C.maculatus** was reared on **D.Lablab** than when reared on **V.radiata** and **V.unguiculata.** Survival and growth response of **C.maculatus** were observed at 20-35° C and were greatest at 30°C and least at 35°C. The cow pea and the environmental temp. of 30°C appear to be the optimal factors of those studied for the success of **C. maculatus** population. KAR

869 THAKKAR (VM). Practical feasibility of using fuvenoids in insect pest management. **Pesticides** 20(8); 1986; 11-2, 14

Various factors related to practical feasibility of using juvenoids in insect pest management and its possibility of developing into effective pesticides non-hazardous to the environment and to human beings and other domestic animals have been discussed . BV

870 BASARGEKAR (SS). Incineration-for effective and complete treatment of pesticide wastes. **Pesticides.** 20(7); 1986; 15-7

This report briefly discussed nature of wastes; method of treatment, ground disposal, bio-treatment, chemical degradation, incineration; and systems used for incineration, conditioning or preparation equipment, conveying and feeding systems, incinerator, waste heat recovery, and air pollution control. BV

871 BINNS (TJ). The comparative toxicity of malathion, with and without the addition of triphenyl phosphate, to adults and larvae of a susceptible and two resistant strains of **Tribolium castaneum** (Herbst) (Coleoptera: Tenebrionidae). **J. Stored Prod. Res.** 22(2); 1986; 97-101

The adults and larvae of susceptible, malathion-specific resistant and multi-organophosphorus resistant strains of **Tribolium castaneum** were exposed to a range of doses of malathion, with and without the addition of the synergist triphenyl phosphate. The compounds were applied by topical application and the mortality response of adults and final instar larvae were compared. In all strains the larvae showed a higher tolerance to the malathion than the adults. A comparison of malathion resistance between the strains showed that the resistance factors achieved for larvae were higher than those for adults. The addition of triphenyl phosphate was completely effective in overcoming the resistance in both adult and larval stage of the malathion specific resistant strain. AA

872 CANTONI (C), CATTANEO (P) and FABBRIS (F). Presence of organochlorine compounds in man, as related to their content in foods of animal origin. **Ind. Aliment. 25**(6); 1986; 446-9 (It)

The authors conclude that the human species will remain exposed to the risks of occasionally contamination with high levels of pesticides for some time to come with unforseeable consequences to human health. Hence, the necessity for more rigorous and frequent control of all food products. KMD

873 SATTIGI (HN) and RAI (PS). Evaluation of some grain protectants against rice weevil, **Sitophilus oryzae** Linnaeus (Curculionidae: Coleoptera) **Pesticides. 20**(8); 1986; 45-7

Five insecticides (Satisfer, Malathion, Sumithion, Baythion and Dursban) each at 0.2 and 0.4% ai. were sprayed on to blotting paper placed inside petridishes to determine their effectiveness against rice weevil **Sitophilus oryzae** Linnaeus, Tabulated results indicate Baythion (0.4% ai) was most effective upto 11th wk. after treatment followed by Baythion (0.2%) Dursban (0.2%) and Dursban (0.4% ai) upto 7th wk. and Satisfer (0.2%) and Sumithion (0.4% ai) upto 5 wk. Other treatments were effective only upto 3 wk.. The order of effectiveness was Baythion > Dursban > Satisfer > Sumithion > Malathion. BV

BIOCHEMISTRY AND NUTRITION

874 ANON. Dietary fish oil alters leukotriene generation and neutrophil function. **Nutr. Rev. 44**(4); 1986; 137-9

Dietary supplementation with eicosapentaenoic acid and docosahexaenoic acid altered synthesis of leukotrienes and their metabolic pathways, and reduced neutrophil movement and adherence to vascular endothelium. AA

875 ANON. Lysinuric protein intolerance: A rare cause of childhood osteoporosis. **Nutr. Rev. 44**(3); 1986; 110-13

876 ANON. Treatment of combined hyperlipidemia with fish and vegetable oils. **Nutr. Rev. 44**(4); 1986; 140-42

877 CUQ (JL) and GILOT (M). Influence of heat treatments on the stability of free or bound tryptophan. Nutritional consequence. **Sci. Aliment. 5**(4); 1985; 687-97

Heat treatment (140 C for 24 h) of a 10 mM solution of tryptophan in water leads to a partial (80%) destruction of the amino acid, and the appearance of some compounds that are less polar than tryptophan. Nutritional experiments on growing rats show that these compounds do not have any tryptophan "potentiality", and are, perhaps, toxic to some extent. When the heat treatment is applied to casein, one can observe a destruction of the tryptophan residues, and a certain reduction in the nutritional availability of tryptophan in the ratio. KMD

878 ROWLAND (IR), MALLETT (AK), FLYNN (J) and HARGREAVES (RJ). The effect of various dietary fibres on tissue concn. and chemical form of mercury after methylmercury exposure in mice. **Arch. Toxicol. 59**(2); 1986; 94-8

The whole-body retention of mercury after exposure of BALB/c mice to methylmercury was measured in animals fed fibre-free, 5% pectin, 5% cellulose or 5, 15 or 30% wheat bran diets. The rate of elimination of mercury was dependent on the diet fed, with dietary bran increasing the rate of elimination. The incorporation of 15 or 30% bran in the diet of the mice decreased the total mercury concn. in the brain, blood and small intestine, although the effects were significant only in those animals on 30% bran diet. The fibres had little effect on mercury levels in other tissues. The proportion of mercury found in the mercuric form was significantly greater in liver, kidneys and gut of mice fed bran. The results suggest that dietary bran may reduce the levels of mercury in the brain after methylmercury exposure and may therefore reduce the neurotoxic effects of the organomercurial. We suggest that wheat bran exerts its effects on mercury retention and brain level via a modification of the metabolic activity of the gut microflora. AA

879 SANTOSH KHOKHAR and CHAUHAN (BM). Saponins in food - their physiological and nutritional significance. **Sci. Cult. 52**(9); 1986; 287-291

Aspects covered in this general article are: chemistry of saponins; sources of dietary saponins; toxicity; and physiological and nutritional significance of saponins. MVG

880 WAGNER (J). New avenues for protein. **Food Eng. Int. 11**(4); 1986; 29-33

This article discussed briefly role of processed proteins in nutritionally balanced foods; future for surimi, amaranth as nutritious grain; dairy proteins; novel new products and hydrolyzed vegetable proteins (HVP). BV

TISSUE CULTURE

Nil

TOXICOLOGY AND HYGIENE

881 BHAVANISHANKAR (TN), SHANTHA (T) and RAMESH (HP). Counteraction of the toxicity of aflatoxin B1 thymine and folic acid in experimental animals. **Nutr. Rep. Int. 33**(4); 1986; 603-12

Thymine injected (ip) along with aflatoxin B1 at LD50 level reduced the mortality in brown mice from 50% in the toxin injected animals to 16.7%. In albino rats the mortality decreased from 62.5% to 25% and 37% resp. by the intraperitoneal injection of thymine and folic acid along with aflatoxin B1. Feeding of aflatoxin B1 to adult albino rats for 3 months resulted in marked hypertrophy and hydropic degeneration of the hepatocytes, reduction in liver DNA content and increase in liver weight. These changes were significantly reduced by feeding thymine or a combination of thymine and folic acid along with the toxin. AA

882 CASTER (WO), BURTON (TA), IRVIN (TR) and TANNER (MA). Dietary aflatoxin, intelligence and school performance in Southern Georgia. **Int. J. Vit. Nutr. Res. 56**(3); 1986; 291-5

883 ROMER (TR). Use of small charcoal alumina cleanup columns in determination of trichothecene mycotoxins in foods and feeds. **J. Assoc. Off. Anal. Chem. 69**(4); 1986; 699-703

884 CANTONI (C), CATTANEO (P) and BALZARETTI (C). Enterotoxigenicity of **Staph. aureus** strains isolated from foods. **Ind. Aliment. 25**(7-8); 1986; 554-6 (It)

To determine whether **Staph. aureus** strains isolated from foods were potential causes of human intoxications, 104 strains obtained from foods of animal origin were examined. Of these, 35.3% strains of Human biotype, 92.3% Bovine biotype and 12.5% swine biotype, produced **in vitro**, enterotoxins. AA

885 LONCIN (M). Recent developments in the field of cleaning and disinfection in the food industry. **Ind. Aliment. Agric. 103**(4); 1986; 201-10 (Fr)

This review covers (i) the causes of soiling and contamination in food industries; (ii) the cleaning process, involving detergents, apparatus, kinetics, procedures and disinfection; and (iii) microbial stability and biotechnology. KMD

ATTENTION OF OUR READERS

The index which used to accompany each issue of Food Technology Abstracts has been for the present discontinued and will be published separately. We have published index upto March 1987 issue of FTA, and now onwards, the index for three issues of FTA will be published together in every quarter. The list of contents published in FTA is quite exhaustive to locate any specific aspect or subject and hope the readers will bear with us. The decision has also been taken in view of our newly started SDI service to our readers. If you have not opted for SDI service please contact us for further information on this to become a member for our SDI service.

Editor
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Vol.22 No.5
May 1987

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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm, cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet

g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal, kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg, ml, mm)
m-equiv	milli-equivalent
M	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano- (10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
$\mathcal{P}$	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)

rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp., spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
μ	micro-(as in μg, μm)
%	per centum
$>$	greater than
$\geq$	greater than or equal to; not less than
$<$	less than
$\leq$	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

GENERAL

886 · Bawa (AS) and Singh (S). Fast foods. An overview. **Indian Food Industry** 5(4); 1986; 165-169

Review covers: fast food preparation and service; nutritional aspects of fast foods and quality assurance in fast food service. BV

887 Brooker (SG). Food and beverages from NZ native plants. **Food Technology in New Zealand** 21(7); 1986; 30, 32-33, 37, 39-41

888 Holdsworth (SD). Dried and tested. **Food** 8(10); 1986; 47, 49, 51

Reviews dried foods and drying techniques. BV

889 Sampson (RL). Innovation in food products. **Food Technology in Australia** 38(10); 1986; 418-421

Recent market trends, changes in consumer behaviour, and new technologies emerging in relevant international market places are highlighted to suggest potential new opportunities for Australian food companies. KAR

890 Shah (CH). The demand for higher-status food and nutrition in Rural India: The experience of Matar Taluka. II. Regression analyses. **Food and Nutrition Bulletin** 8(3); 1986; 49-62

FOOD PROCESSING

891 Sastry (SK). Mathematical evaluation of process schedules for aseptic processing of low-acid foods containing discrete particulates. **Journal of Food Science** 51(5); 1986; 1323-1328

This study aims to develop a model for aseptic processing of particulate foods, which considers the influences of particle size, residence time distributions and the estimated values of convective coeff. while being applicable to particles of regular or irregular shapes. OES

FOOD PACKAGING

892 Blenford (D). Gas packaging. **Food** 8(11); 1986; 37, 39, 41

Covers developments in food preservation through the use of gas packaging. BV

893 Smith (DG) and Wailes (RW). A novel use of gases to extend the storage life of foodstuffs: A note. **Food Technology in Australia** 38(5); 1986; 205

The process described involves replacing intra tissue gases in the food with one or more gases in an appropriate sequence. A typical process sequence is as follows: Open containers of food are placed in the vessel which is evacuated to remove air from the vessel and also from within the tissue of the food. The apparatus is then filled with an enzymocidal gas, e.g. carbon monoxide, reevacuated and filled with a bacteriocidal gas e.g. ethylene oxide, reevacualted and flushed several times with an inert gas, e.g. nitrogen. The products are then sealed in flexible packages. KAR

Packaging materials

894 Goddard (K). The potential of PET. **Food Manufacture** 61(9); 1986; 22-23, 25

Discusses polyethylene terephthalate (PET) as new packaging material for food; use in Europe and its future potential. BV

895 Jayaraman (S). Rapid analysis of organotins in polyvinyl chloride (PVC) based packaging materials. **Indian Food Packer** 41(1); 1987; 64-67

A rapid assay procedure for the micro determination of organotin stabilizers in PVC - based packaging materials based on the quantitative colour complex formation is described. KAR

896 Mahadeviah (M), Naresh (R) and Gowramma (RV). Commercial trials of TCIL-OTSC quality tinplate. **Indian Food Packer** 41(1); 1987; 26-41

The suitability of tin plate manufactured by Tinplate Co. of India Ltd. (TCIL), Jamshedpur (India) was studied by canning (i) mango pulp, (ii) tomato puree, (iii) orange juice, (iv) pineapple products including juice, titbits and slices separately, (v) jam from grape and cherry, (vi) guava, (vii) potatoes and (viii) mango juice, under factory conditions. Canned products were stored at room temp. (25-30 C) and at 37 C and analysed at 3 month intervals for can appearance, loss of vacuum, can interior surface for detinned spots/patches and for organoleptic quality of the product. Upto 9 months the quality of (i) was acceptable, with the tin content below the acceptable limit. After 12 months heavy feathering with heavy detinning was observed. In (ii) upto 6 months the quality of the product was good with heavy feathering and slight detinning. After 12 months storage especially at 37 C complete detinning was noticed. With (iii) the quality of the product (colour, taste and flavour) stored at both the temp. remained good and was acceptable upto 12 months storage. In (iv) the quality of the pineapple products was good and only after 11 months at 37 C metallic taste was perceptible in all the products. In (v) after 2 months storage at 37 C both the products had slight metallic taste in both TCIL and control cans. In (vi) upto 12 months at ambient temp. the product was acceptable but at 37 C metallic taste with heavy feathering of TCIL was observed. In (vii) the quality of the product was acceptable at both the temp. upto 12 months storage. In (viii) upto 9 months vacuum retention was good and the quality of the product was good at both the temp. upto 12 months. It is concluded that the OTSC quality tinplate manufactured by TCIL compares well with imported tinplate in canning trials conducted under factory conditions and hence could be used for canning processed fruit products and for potato in brine. KAR

FOOD ENGINEERING AND EQUIPMENT

897 Aishima (T) and Nakai (S). Centroid mapping optimization. A new efficient optimization for food research and processing. **Journal of Food Science** 51(5); 1986; 1297-1300, 1310

898 Succar (J) and Hayakawa (KI). A response surface method for the estimation of convective and radiative heat transfer coefficients during freezing and thawing of foods. **Journal of Food Science** 51(5); 1986; 1314-1322

899 Zilberboim (R), Kopelman (IJ) and Talmon (Y). Microencapsulation by a dehydrating liquid: A microstructural study by scanning electron microscopy. **Journal of Food Science** 51(5); 1986; 1307-1310

Equipment

900 Pollio (ML), Kitic (D), Favetto (GJ) and Chirife (J). Effectiveness of available filters for an electric hydrometer for measurement of water activity in the food industry. **Journal of Food Science** 51(5); 1986; 1358-1359

Driers

901 Kutcher (PA) and Cox (GC). Evaporation and drying of heat sensitive products. **Food Technology in Australia** 38(8); 1986; 326-330

The new spray drying plants described are two spray drier developments called Multi-Stage Drier and compact Drier. The latter appears in two versions: Compact straight-through drier and compact two-stage drier. Compact refers to the need for only a spray drying chamber of limited height thereby giving substantial savings in installation and structured building costs. These drier types are discribed with flow sheets, and their performance and heat economy compared with those of conventional spray driers. KAR

Filters

902 Morris (N). High efficiency filters in process filtration. **Chemistry and Industry** (21); 1986; 745-749

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

903 Mohamed (AI), Perera (PAJ) and Hafez (YS). New chromophore for phytic acid determination. **Cereal Chemistry** 63(6); 1986; 475-478

Chemistry (Analytical)

904 Kim (H-J) and Kim (YK). Analysis of free and total sulphites in food by ion chromatography with electrochemical detection. **Journal of Food Science** 51(5); 1986; 1360-1361

905 Sankar Das (M). Approaches to the truth in analytical chemistry. The accurate result. **Journal of the Indian Chemical Society** 42(12); 1985; 1043-1051

FOOD MICROBIOLOGY AND HYGIENE

Microbiology

906 McMeekin (JA) and Olley (J). Predictive microbiology. **Food Technology in Australia** 38(8); 1986; 331-334

A method for the prediction of the rate of food spoilage based on relative spoilage rates at different temp. is discussed. The temp. history of food in storage can be monitored continually using an electronic temp. function integrator. This accounts for temp. fluctuations by converting data to an equivalent time at a reference temp. An integrator is available to monitor psychrotrophic spoilage, and others are proposed for predicting mesophilic spoilage and the growth of food borne pathogens. KAR

907 Sharpe (AN), Diotte (MP), Peterkin (PI) and Istvan (D). Towards the truly automated colony counter. **Food Microbiology** 3(3); 1986; 247-270

A new approach to electronically counting the microbes is described. The counter discriminated easily between two bacterial species on one plate, distinguishing and separatly counting **Aeromonas hydrophila** (brown yellow) and **Citrobacter freundii** (light yellow). KAR

908 Tarka (EF) and Fields (ML). Yeast mutants containing elevated methionine. **Journal of Food Science** 51(5); 1986; 1273-1275

Bacteria

Lactobacillaceae

909 Vanos (V) and Cox (L). Rapid routine method for the detection of lactic acid bacteria among competitive flora. **Food Microbiology** 3(3); 1986; 223-234

The new elective modified CHALMERS medium developed by the laboratory was found useful for enumerating lactic acid bacteria and gave best results for both the selectivity and the standard deviation of the counts. It is a cheap and rapid method. KAR

Salmonella

910 De Smedt (JM), Bolderdijk (RF), Rappold (H) and Lautenschlaeger (D). Rapid **Salmonella** detection in foods by motility enrichment on a modified semi-solid Rappaport-Vassiliadis medium. **Journal of Food Protection** 49(7); 1986; 510-514

The method was highly sensitive in detecting **Salmonella** contamination in foods. The medium performance was dependent on the type of peptone MgCl concn., presence of novobiocin and incubation temp. The procedure consisted of preenrichment for 20 h followed by motility enrichment on MSRV medium for 24 h and, if there is migration serological tests with the mature culture. The results were achieved within 48 h of preenrichment. This test gave 39% more **Salmonella** samples than enrichment in tetrathionate brilliant green broth with subsequent plating. MVG

Enzymes

Amylases

911 Moideen Kutty (AV) and Pattabiraman (TN). Specificity of plant amylase inhibitors on ten pancreatic $Alpha$ amylases. **Journal of Food Biochemistry** 10(2); 1986; 117-124

Action of amylase inhibitors in 6 starchy grains and 2 legume seeds on human and nine different animal pancreatic amylases was studied. MVG

Rennets

912 Martinez (EB), Tesone (S) and Quevedo (F). Survey of the microbiological quality of adult bovine rennet extracts. **Journal of Food Protection** 49(7); 1986; 507-509

Fermentation

913 Kemblowski (Z) and Kristiansen (B). Rheometry of fermentation liquids. **Biotechnology and Bioengineering** 28(10); 1986; 1474-1483

Fungi

Aspergillus

914 Annunziato (ME), Mahoney (RR) and Mudgett (RE). Production of $Alpha$-**galactosidase** from **Aspergillus oryzae** grown in solid state culture. **Journal of Food Science** 51(5); 1986; 1370-1371

This study examines the effects of various substrates and culture conditions on enzyme production with the aim of improving enzyme yield and lowering production costs. OES

915 D'Aquino (M), Santini (P) and Muzio (H). Action of halogenated compounds on **Aspergillus** conidiospores. **Journal of Food Protection** 49(7); 1986; 537-540, 543

Mushrooms

916 Anantheswaran (RC), Sastry (SK), Beelman (RB), Okereke (A) and Konanayakam (M). Effect of processing on yield, colour and texture of canned mushrooms. **Journal of Food Science** 51(5); 1986; 1197-1200

Effects of different times and temp. of thermal processing on yield, colour and texture of canned mushrooms, with and without vacuum hydration prior to blanching were studied. Vacuum hydration prior to blanching improved yields significantly. Yield, colour and texture decreased with increased process time at all temp. In case of vacuum hydrated mushrooms, the activation energies were found to be 16.0, 16.2 and 31.3 Kcal/mol. for yield, colour and texture resp. As for the non-hydrated mushrooms, the corresponding values were 15.9, 38.4 and 38.5 Kcal/mol. Vacuum hydration caused colour and texture to be relatively insensitive to process temp. OES

917 Gormley (TR). Mushroom processing. Retaining colour without losing weight. **Mushroom Journal** (167); 1986; 387-391

Breaded frozen mushrooms or the pretreatment of mushrooms for freezing and canning with xanthan solution offer most potential in terms of wt. conservation during processing and in maintaining good product quality. BV

Yeasts

918 Splittstoesser (DF), Leasor (SB) and Swanson (KMJ). Effect of food composition on the heat resistance of yeast ascospores. **Journal of Food Science** 51(5); 1986; 1265-1267

The ascospores of **Saccharomyces cerevisiae** were over 100-fold more resistant than vegetative cells of the same strain. The D_{60} of spores in apple juice was 6.1 min and the z value was 3.8 C; in a Chenin blanc wine the D_{55} was 0.57 min and the z value was 6.7 C. The presence of sugar in the heating medium increased spore resistance while alcohol reduced it; varying pH over the range 3.0 to 7.0 had little effect. AA

Single cell proteins

919 Araujo (A) and D'Souza (J). Enzymatic saccharification of pretreated rice straw and biomass production. **Biotechnology and Bioengineering** 28(10); 1986; 1503-1509

A comparative study on the saccharification of pretreated rice straw was brought about by using cellulase enzyme produced by **Aspergillus terreus** ATCC 52430 and its mutant strain UNGI-40. The effect of enzyme and substrate concn. on the saccharification rate at 24 and 48 were studied. A syrup with 7% sugar concn. was obtained with a 10% substrate concn. for the mutant case, whereas a syrup with 6.8% sugar concn. was obtained with 3.5 times conc enzyme from the wild strain. A high saccharification value was obtained with low substrate concn.; the higher the substrate concn. used, the lower the percent saccharification. The glucose content in the hydrolysate comprised 80-82% of total reducing sugars; the remainder was cellobiose and xylose together. The hydrolysate supported the growth of yeasts **Candida utilis** and **Saccharomyces cerevisiae** ATCC 52431. A biomass with a 48% protein content was obtained. The essential amino acid composition of yeast biomass was determined. AA

Hygiene

920 Makukutu (CA) and Guthrie (RK). Survival of **Escherichia coli** in food at hot-holding temperatures. **Journal of Food Protection** 49(7); 1986; 496-499

Survival of E. coli was evaluated in hot foods for one hour held at each of hot-holding temp. (40 C - 60 C). Results showed that the pathogen survived these temp. in each type of food for the whole period of evaluation. At below 50 C the population increased while at higher temp. there was a decrease in population with time. A two way analysis of variance using relative rates of increase or decrease (+ b) showed that food type to be unimportant for the survival of the bacteria. Holding temp., food type, holding time, and the interactions of temp. and food type and temp. and time were significant for survival of the pathogen as shown by a three-way analysis of variance of the same result using mean log CFU/g food. MVG

BIOTECHNOLOGY

Nil

TISSUE CULTURE

921 Quinlan (AV). A semicontinuous culture model that links cell growth to extracellular nutrient concentration. **Biotechnology and Bioengineering** 28(10); 1986; 1455-1461

FOOD ADDITIVES

Antioxidants

922 Mahoney (JRJr) and Graf (E). Role of $alpha$-tocopherol, ascorbic acid, citric acid and EDTA as oxidants in model systems. **Journal of Food Science** 51(5); 1986; 1293-1296

Flavourings

923 Beacham (BA). A taste of things to come. **Food** 8(10); 1986; 41, 43, 45

Reviews the legislative control of flavours in the UK. BV

924 Tuley (L). The heat is on. **Food** 8(10); 1986; 53

Covers drying techniques used in the flavour industry. BV

Stabilizers

925 Gregory (D). Functional food ingredients. **Food** 8(11); 1986; 22-23, 25

Aspects covered include emulsifiers and stabilizers in dairy industry; proteins; plant exudates; seed gums; seaweed extracts; pectins; cellulose derivatives; microbial gums; market trends; health brands; convenience brands; and scope for advancement. BV

Carrageenans

926 Unions (A). Carrageenan focus. **Food** 8(11); 1986; 27, 29, 31

Aspects covered include synergism with locust bean gum; applications (meat products; salad dressings); protein reactivity (ice cream); Cheese analogues and toxicology. BV

Gums

927 Anderson (DMW), Busuttil (A), Kempson (SA) and Penman (DW). Transmission electron microscopy of jejunum, ileum, and caecum tissues from rats fed with gum arabic, karaya and tragacanth. **Toxicology** 41(1); 1986; 75-82

Transmission electron microscopy has been used to study the ultrastructure of rat jejunum, ileum and caecum after dietary supplementation with (a) 10% (w/w) gum arabic, (b) 7% (w/w) gum karaya, (c) 4% (w/w) gum tragacanth for 45 days. Scrutiny of 65 micrographs, undertaken independently by 2 specialists, revealed no abnormalities in any of the organelles in any of the micrographs. Twelve representative micrographs are reproduced.

Guar gum

928 Plutchok (GJ) and Kokini (JL). Predicting steady and oscillatory shear rheological properties of CMC and guar gum blends from concentration and molecular weight data. **Journal of Food Science** 51(5); 1986; 1284-1288

Xanthan gum

929 Pinches (A) and Pallent (LL). Rate and yield relationships in the production of xanthan gum by batch fermentations using complex and chemically defined growth media. **Biotechnology and Bioengineering** 28(10); 1986; 1484-1496

Rate and yield information relating to biomass and product formation and to nitrogen, glucose and oxygen consumption are described for xanthan gum batch fermentations in which both chemically defined (glutamate nitrogen) and complex (peptone nitrogen) media are employed. Simple growth and product models are used for data interpretation. For both nitrogen sources, rate and yield parameter estimates are shown to be independent of initial nitrogen concn. For stationary phases, specific rates of gum production are shown to be independent of nitrogen source but dependent on initial nitrogen concn. The latter is modeled empirically and suggests caution in applying simple product models to xanthan gum fermentations. AA

CEREALS

930 Gorinstein (S), Quicke (GV) and Phillips (AM). Detection of low molecular weight reduced zein polypeptides separated by polyacrylamide gel electrophoresis. **Journal of Food Science 51(5); 1986; 1366-1367, 1369**

931 Scudamore (KA) and Goodship (G). Determination of phosphine residues in fumigated cereals and other foodstuffs. **Pesticide Science 17(4); 1986; 385-395**

An improved method for the determination of phosphine residues in foodstuffs with a limit of detection better than 0.1 µg kg^{-1} is described. Results show that in cereal grains and nuts residues fall quickly to below internationally recommended levels although trace amounts of phosphine could be detected several months after treatment in all commodities examined. KAR

Barley

932 Ahluwalia (B) and Fry (SC). Barley endosperm cell walls contain a feruloylated arabinoxylan and a non-feruloylated $Beta$-glucan. **Journal of Cereal Science 4(3); 1986; 287-295**

933 Heisel (SE), Peterson (DM) and Jones (BL). Identification of United States barley cultivars by sodium dodecyl sulphate polyacrylamide gel electrophoresis of hordeins. **Cereal Chemistry 63(6); 1986; 500-505**

934 Henry (RJ). Genetic and environmental variation in the pentosan and $Beta$-glucan contents of barley, and their relation to malting quality. **Journal of Cereal Science 4(3); 1986; 269-277**

The genetic and environmental variation in pentosans and (1→3), (1→4) $Beta$-glucans was examined in 17 var. of barley grown at 3 different locations. The arabinose, xylose and total pentosan contents and the arabinose:xylose and pentosan: $Beta$-glucan ratios were all influenced by environment. Genetic differences were found in arabinose, xylose, total pentosan and $Beta$-glucan contents and in pentosan $Beta$-glucan ratio. The pentosan content of the var. varied from 4.4 to 7.8% and the $Beta$-glucan content from 3.4 to 5.7%. Significant genetic differences were not observed for the arabinose: xylose ratio. The $Beta$-glucan and pentosan contents were correlated with the malt extract obtained on micro-malting. Smaller grains had a higher pentosan content and pentosan: $Beta$-glucan ratio. AA

935 Lai (FS), Pomeranz (Y) and Robbins (GS). Effects on barley and malt of oil additives to reduce dust. **Cereal Chemistry 63(6); 1986; 512-513**

Four barley cv. and four malts from those cv. were treated with 200 and 400 p.p.m of mineral or soybean oil. The treatment reduced fine grain dust. Oil treatment had a small effect on barley colour. Diastatic power and $Alpha$-amylase in malt from treated barley were lower than in the controls. The decrease was not significant at the 0.05 level. Treatment of malt had no significant effect on fine-minus-coarse extract difference, wort colour, wort protein, diastatic power, or $Alpha$-amylase. AA

936 Ullrich (SE), Clancy (JA), Eslick (RF) and Lance (RCM). $Beta$-Glucan content and viscosity of extracts from waxy barley. **Journal of Cereal Science 4(3); 1986; 279-285**

Rice

937 Chung (K-T) and Sun (H-L). Distribution and characteristics of **Bacillus cereus** isolated from rice in Taiwan. **Journal of Food Science** 51(5); 1986; 1208-1212

Sixty six strains of **Bacillus cereus** were isolated from 12 kinds of rice samples collected in Taiwan using PEMBA (Polymiocin pyruvate egg yolk mannitol bromothymol blue agar. Spore suspensions prepared from six isolates were used to study the different characteristics, especially their heat resistance. OES

938 Karera (A), Nargis (S), Patel (S) and Patel (M). Silicon-based materials from rice husk. **Journal of Scientific and Industrial Research** 45(10); 1986; 441-448

939 Olalquiaga (R), Guinard (J-X) and Singh (RP). Effect of parboiling and freezing on quality of three Spanish rice varieties. **Journal of Food Processing and Preservation** 10(3); 1986; 189-202

The effects of parboiling and of freezing at - 18, -40 C or in liquid nitrogen on quality of cooked rice was studied for three Spanish var., Bahia, Sequial and Italpatna, using instrumental and sensory measurements. Parboiling prior to cooking and then freezing reduced rice quality. Freshly cooked samples differed from frozen cooked samples for firmness as measured instrumentally but not for any of the sensory parameters. Principal component analysis did not separate samples on the basis of their varietal quality. AA

Wheat

940 Caprez (A), Arrigoni (E), Amado (R) and Neukom (H). Influence of different types of thermal treatment on the chemical composition and physical properties of wheat bran. **Journal of Cereal Science** 4(3); 1986; 233-239

Water uptake, water-binding capacity, rheological behaviour in the Farinograph and oil absorption of boiled, steam-cooked, autoclaved, roast, micronised and extruded bran were determined. The water uptake of the modified samples was increased, compared with that of the untreated bran. Only boiling affected the water-binding capacity significantly. The largest effects of the thermal modifications were rheological changes as observed in the Farinograph. Doughs, consisting of 80% patent flour and 20% wheat bran, showed a diminished max. resistance and a prolonged mixing time compared with a standard dough with long patent flour. Wet heat treatments altered the surface of the wheat bran, resulting in a change in the oil absorption capacity. KAR

941 Claflin (JK), Evans (DE), Fane (AG) and Hill (RJ). The thermal disinfestation of wheat in a spouted bed. **Journal of Stored Products Research** 22(3); 1986; 153-161

Batches of wheat infested with all stages of **Rhyzopertha dominica** were heated in a 300 mm diam. spouted bed fitted with a draft-tube to control grain and air flow paths. This apparatus combines features of pneumatic and packed bed systems. For a 16 kg batch of wheat spouted with 0.07 kg s^{-1} of air the time to achieve 99.9% mortality ($Lt_{99.}$ decreased from 13.6 to 2.6 min. as inlet air temp. was increased from 80 to 180 C. $Lt_{99.9}$ increased with increase in bed mass and decrease in air flow rate, and was sensitive to the type and axial position of the draft-tube. Bed temp. corresponding to $Lt_{99.9}$ were in the range of 60-66 C depending on operating conditions. Some mechanical kill was also detected. Thermal contact efficiencies varied from 45 to 80% and were sensitive to operating and design parameters. The practical considerations for the scale-up of spouted bed disinfestors are discussed. AA

942 Gaines (CS). Texture (hardness and softness) variation among individual soft and hard wheat kernels. **Cereal Chemistry** 63(6); 1986; 479-484

The texture of individual kernels of soft and hard wheat cv. was measured by grinding individual kernels in ethanol in a blender jar and subsequently determining median particle size by laser light scattering. This method parallels the production and measurement of bread-flour yield of bulk wheat samples. There was a large variation in individual kernel texture within a cv. Most variation in kernel texture of a particular cv.was observed among the kernels of a single wheat rachis (head). The influence of kernel wt, and indirectly, size, on the measurement of kernel texture was small enough to allow good separation of soft and hard wheat texture data. Estimates of the kernel texture/wt relationship were sufficiently precise to reduce the overlapping of soft and hard wheat data from 6% without consideration of kernel wt. to 1.5% when wt. was included in the regression. Many hundreds or thousands of kernels were required to statistically differentiate between two samples containing mixtures of hard and soft wheat kernels that have mixture ratios as close as 2%. Overlapping of soft and hard wheat data greatly increases the number of kernels required but is a consequence of a single-kernel method that has a strong relationship with kernel wt., size, and density. If these factors are considered by least squares regression, overlapping may be reduced. AA

943 Krishnaiah (MM) and Haridas Rao (P). Possible approaches to increase the utilization of wheat. **Indian Miller** 17(4); 1987; 33, 35, 37-38

Possible approaches discussed to utilize the surplus wheat produced in India are: (i) increasing the turnover of bakery products and diversification of products; (ii) producing different breakfast cereals; and (iii) developing different wheat based products using several feeding programmes and using wheat for extracting starch and gluten. MVG

944 Lookhart (GL), Albers (LD) and Bietz (JA). Comparison of polyacrylamide gel electrophoresis and high-performance liquid chromatography analyses of gliadin polymorphism in the wheat cultivar Newton. **Cereal Chemistry** 63(6); 1986; 497-500

945 Marsh (DR) and Galliard (T). Measurement of polyphenol oxidase activity in wheat-milling fractions. **Journal of Cereal Science** 4(3); 1986; 241-248

Polyphenol oxidase (PPO) activity in finely milled wholewheat and milling fractions has been studied by measuring oxygen consumption of aqueous suspensions after addition of catechol as substrate. Wheat bran contained higher levels of PPO than did wholemeal; white flour contained relatively low levels, and no PPO activity was detected in a germ-rich milling fraction. In wholemeal, 72% of the total PPO activity remained in a washed, insoluble residue after extraction with aqueous buffer solutions. Although treatment of wholemeal with solutions containing sodium dodecylsulphate, Triton X-100 or lactic acid caused substantial increases in the total PPO activity, most of this remained in the insoluble residue. The results are discussed in relation to a widely used alternative assay for PPO activity based on spectrophotometric measurements with aqueous extracts of ground wholewheat. AA

946 Marshall (DR), Mares (DJ), Moss (HJ) and Ellison (FW). Effects of grain shape and size on milling yields in wheat. II. Experimental stu-

dies. **Australian Journal of Agricultural Research** 37(4); 1986; 331-342

The results reported indicate that any one factor is predominantly important in determining genotypic variation in milling yield. The effects of some of these other attributes of wheat grains, which may influence milling yield (e.g. the amount of germ tissue, thickness of bran, depth of crease) were also studied. Free milling wheats appeared to differ from their poorer milling counterparts in several of these factors, each of which appeared to take a minor but cumulative contributions to differences in milling yield. No one factor studied here appeared on its own to make a major contribution to genotypic difference in milling yield. KAR

947 Moss (HJ), Miskelly (DM) and Moss (R). The effect of alkaline conditions on the properties of wheat flour dough and cantonese-style noodles. **Journal of Cereal Science** 4(3); 1986; 261-268

948 Mullin (WJ) and Jui (PY). Folate content of bran from different wheat classes. **Cereal Chemistry** 63(6); 1986; 516-518

949 Nagarsekar (CL). Normal foods from wheat products, particularly wheat gluten **Indian Miller** 17(4), 1987; 23, 25-27, 29, 31

Methods of manufacture of wheat gluten; its functional properties; and its use in food, meat analog and processed meat products; and non food uses of gluten are the aspects covered.MVG

950 Payne (PI), Holt (LM), Burgess (SR) and Shewry (PR). Characterisation by two-dimensional gel electrophoresis of the protein components of protein bodies, isolated from the developing endosperm of wheat (**Triticum aestivum**). **Journal of Cereal Science** 4(3); 1986; 217-223

Protein bodies were extracted from the developing endosperm of two var. of wheat and isolated by sucrose-gradient centrifugation. Their protein constituents were characterised by two-dimensional electrophoresis and compared with the proteins of the mature endosperm. It was concluded that for both var. all the major proteins previously identified as prolamins, i.e. glutenin subunits and gliadins, occur in protein bodies. Also present in protein-body preparations are the 'triplet-band' proteins. In contrast, the 'non-storage proteins' occur in only trace amounts in protein-body preparations while the high mol. wt. (HMW) albumins are absent. Also absent are the 7S storage globulins, which is probably due to their location in the embryo and aleurone layer rather than the starchy endosperm. AA

951 Pomeranz (Y), Lai (FS) and Rousser (R). Wheat sections-their preparation and characterization. **Cereal Chemistry** 63(6); 1986; 513-515

A rotary cutter was developed to prepare 0.057-in cross sections of wheat. The sections were suitable for examination under low magnification, scanning electron microscopy, crushing for detn. of hardness, and variety identification on the basis of electrophoretic patterns of gliadins. The germ-end part obtained during the preparation of the cross section was viable. AA

952 Schweizer (TF), Reimann (S), Solms (J), Eliasson (AC) and Asp (NG). Influence of drum-drying and twin-screw extrusion cooking on wheat carbohydrates. II. Effect of lipids on physical properties, degradation and complex formation of starch in wheat flour. **Journal of Cereal Science** 4(3); 1986; 249-260

Wheat flour was drum-dried or extruded with and without addition of 2% soy oil or 1% linoleic acid, otherwise maintaining similar processing conditions. The starches in the resulting products were characterised in terms of their water solubilities, pasting properties, mol. wt. distributions and in vitro digestibilities. Starch-lipid interactions were investigated by measuring the efficiency of fat extraction, the amount of complexed starch calculated from iodine-binding capacities and the thermal behaviour of the flour in differential scanning calorimetry. All drum-dried flours exhibited less starch breakdown and higher initial Brabender viscosities than extruded flours. Lipid addition decreased viscosity and water solubility. The extent of starch breakdown was unaffected by linoleic acid but, surprisingly, increased upon addition of soy oil. Starches from all samples were equally available to glucoamylase, but pancreatic $Alpha$-amylase digested drum-dried, and especially extruded, flours more slowly than an autoclaved control. Linoleic acid, but not soy oil, further decreased $Alpha$-amylolysis rates. An additional autoclaving increased digestion rates and abolished differences between the two processes. A close relationship existed between the degree of $Alpha$-amylolysis and the amount of complexed starch. AA

953 Seguchi (M). Dye binding to the surface of wheat starch granules. **Cereal Chemistry** 63(6); 1986; 518-520

Protein-specific dyes (Coomassie brillant blue, eosin Y, and amido black 10B) were bound to wheat prime starch granules. Microscopic observation of dye-treated starch granules showed colour on their surface. Fluorescamine-treated starch granules showed fluorescence under a fluorescence microscope. Glass beads coated with bovine serum albumin could be stained with amido black 10B, but glass beads without this coating could not be stained. Phase contrast microscopic observation of amido black 10B-stained and dried starch granules showed peeling of their coloured surface protein film from starch granules, indicating the presence of a protein film on the surface of the starch granule. After various treatments (7.0% HCl, 0.2% NaOH, and 1.0% sodium dodecyl sulphate) of wheat prime starch, dye-binding capacity (with amido black 10B) decreased to about 70% of the nontreated sample. Complete exclusion of the surface protein was not observed. After extensive treatment, the starch granules swelled and completely lost dye-binding capacity. AA

Wheat bran

954 Kahlon (TS), Chow (FI), Hoefer (JL) and Betschart (AA). Bioavailability of vitamins A and E as influenced by wheat bran and bran particle size. **Cereal Chemistry** 63(6); 1986; 490-493

Influence of wheat bran and bran particle size on the bioavailability of vitamin A and E was evaluated by determining the plasma and liver levels of these vitamins. Results showed that course but not fine wheat bran significantly lowered the bioavailability of $Alpha$-tocopherol as reflected in the lower values. Neither wheat bran or cellulose fiber did not appear to impair bioavailability of retinol in this study. MVG

Wheat flour

955 Saim (N) and Meloan (CE). Compounds from leaves of bay (**Laurus nobilis L.**) as repellents for (**Tribolium castaneum**) (Herbst) when added to wheat flour. **Journal of Stored Products Research** 22(3); 1986; 141-144

Of the 15 volatile compounds found in bay leaves only three compounds - benzaldehyde, piperidine and geramiol when present at 50 p.p.m. were repellent to T. castaneum. Alpha pinene was an attractant. KAR

MILLETS

Corn

956 Davis (ND), Currier (CG) and Diener (UL). Aflatoxin contamination of corn hybrids in Alabama. **Cereal Chemistry** 63(6); 1986; 467-470

Aflatoxin contamination was determined in 215 corn hybrids grown for different periods and locations. Results showed that there was no resistance to aflatoxin formation in any hybrid tested and significant aflatoxin levels generally accompanied stress caused by high temp., low rain fall, low-moisture-holding capacity of sandy soils and insect infestation. MVG

957 Nanson (NJ) and Fields (ML). Influence of pH on available amino acid concentration in fermented cornmeal. **Journal of Food Science** 51(5); 1986; 1372, 1377

The influence of pH over a range of 4.0 to 10.5 on the availability of lysine, methionine and tryptophan from fermented cornmeal was reported. Fermentations of days 1 and 2 produced the highest concn. of available amino acids (pH 4.0-4.5 and 5.0-5.5) which then decreased by days 3 and 4. OES

958 Nyotu (HG), Alli (I) and Paquette (G). Soy supplementation of a maize based Kenyan food (Ugali); Soy flour. **Journal of Food Science** 51(5); 1986; 1204-1207

The effect of supplementation of maize meal with soy flour on the nutritive value of the staple Kenyan dish, **Ugali**, was studied. Supplementation at 10, 20 and 30% with soy flour resulted in the increase of protein, minerals, phytate and oligosaccharide contents. It also resulted in the increased chemical score and available lysine. Soy supplemented **Ugali** showed a good digestibility. Supplementation upto 20% did not affect the taste preference for the supplemented **Ugali**. The over all nutritional value of **Ugali** could be improved substantially by supplementing the maize meal with 20% soy flour. OES

959 Paulis (JW) and Bietz (JA). Separation of alcohol-soluble maize proteins by reversed-phase high performance liquid chromatography. **Journal of Cereal Science** 4(3); 1986; 205-216

Ragi

960 Shukla (SS), Gupta (OP), Sharma (YK) and Sawarkar (NS). Puffing quality characteristics of some ragi (**Eleusine coracana**) cultivars. **Journal of Food Science and Technology, India** 23(6); 1986; 329-330

Eight improved var. of Ragi (JNR 852, JNR 981, JNR 1008, PR 202, WR 13, CO 9, WR 5 and WR 4) were tested for their protein, carbohydrate, sugars, fat, phytic acid and puffing yield and organoleptic quality. The range in values were protein content 5.61-8.83%, fat content 1.08-1.47%; phytic acid 65.0 - 133.3 mg/100 g; bulk vol. 3.3-8.4 ml/g and puffing yield 66.0-95.3%. Ca, P, S, Na, K and Mg content of these ragi var. are also given. Brown seeded var. (PR 202 and JNR 852) in general gave max. puffing yield, but white seeded var. gave organoleptically superior quality puff. KAR

Sorghum

961 Glover (JM), Walker (CE) and Mattern (PJ). Functionality of sorghum flour components in a high ratio cake. **Journal of Food Science** 51(5); 1986; 1280-1283, 1292

High ratio cakes baked from composite flours of hard red winter wheat and grain sorghum were inferior to those baked from wheat flour alone. Interchanging of the lipid, water soluble and starch fractions of sorghum with that of wheat, barley brought about any improvement in the quality of the cake. Substituting dextrose for sucrose lowered the gelatinization temp. resulting in a greatly improved cake volume and texture. OES

PULSES

962 Deshpande (SS) and Cheryan (M). Microstructure and water uptake of phaseolus and winged beans. **Journal of Food Science** 51(5); 1986; 1218-1223

The role of seed microstructure in initial water uptake during the soaking of Phaseolus and winged bean seeds was investigated. Considering their relatively small area, hilum and micropyle seemed to be the most important structural features influencing the initial water uptake. Seed coat played a dominant role only after its initial resistance to water uptake was overcome. Varieties with high initial water uptake also had relatively thin seed coats, a loosely arranged cell structure on the raphe-side of the hilum, a deeply grooved hilar fissure, and a narrow tracheid bar. Water absorption in legumes appeared to be a complex process with the seed coat, hilum and micropyle together constituting an integrated water absorption system. AA

963 Sarwar (G) and Peace (RW). Comparisons between true digestibility of total nitrogen and limiting amino acids in vegetable proteins fed to rats. **Journal of Nutrition** 116(7); 1986; 1172-1184

After testing with soaked and autoclaved samples of Trapper and Century field peas, lentil, pinto bean, safarar bean, black bean or faba bean and autoclaved samples of soybean, peanut, sunflower, rolled oat, rice + soybean, and corn + pea, it was observed that crude protein digestibility may not be a good predictor of biavailability of limiting amino acids in vegetable proteins. Amino acid scores of the vegetable proteins were 62-96%. The corrections for true digestibility of protein and individual amino acids, lowered the scores by 6-15 and 11-47 percentage units, respectively. KAR

Broad beans

964 Askar (A). Faba beans (Vicia faba L.) and their role in the human diet. **Food and Nutrition Bulletin** 8(3); 1986; 15-24

This article covers popular ways of preparing faba beans in the Middle East (Stewed faba bean (Fool medames); bean cakes (Falafel or taama) and germinated beans (Fool nabet); protein and amino acids; starch and oligosaccharides; air classification; flatus producing factors; protease inhibitors; lectins (haemagglutinins); tannins; phytate (phytins) and favism-inducing factors. BV

Tempeh

965 Berghofer (E) and Werzer (A). Production of "**Tempeh**" with indigenous beans. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(1/2); 1986; 54-62 (De).

An attempt was made to prepare "**tempeh**" from field beans (**Vicia faba** L.) grown in Austria, using the fungus **Rhizopus oligosporus** SAITO. Beans of the Minica var. (found to be its best suited Austrian bean for "tempeh" making) were first ground and their skin removed; they were then disintegrated. The bean mass was then inoculated with a spore suspension and fermentation allowed to proceed. Products of optimal sensory quality were obtained shortly after the max. temp. and the second pH. max. had been surpassed. Thus, fermentation can be easily controlled by measuring the pH or temp. of its product. The course of fermentation has been characterized exactly by analyses for dry matter, ash, total N, soluble N, starch, glucose, niacin and riboflavin. KMD

Kidney beans

966 Kermasha (S) and Metche (M). Characterization of seed lipoxygenase of **Phaseolus vulgaris** cv. Haricot. **Journal of Food Science** 51(5); 1986; 1224-1227

The extraction, purification and characterisation of an enzyme, the lipoxygenase from haricot (**Phaseolus vulgaris**) seed are reported in detail. OES

967 Van Buren (J), Bourne (M), Downing (D), Queale (D), Chase (E) and Comstock (S). Processing factors influencing splitting and other quality characteristics of canned kidney beans. **Journal of Food Science** 51(5); 1986; 1228-1230

Splitting in canned kidney beans was markedly reduced by soaking beans in calcium chloride solutions at 66 C. Treatments giving lower gain in wt. during soaking led to less splitting. Significant reductions in splitting resulted from higher soak calcium chloride concn. higher soak temp. higher brine calcium chloride concn. and shorter cooking times. Lower % splitting was associated with lower drained wt. and firmer cooked beans. OES

Lupins

968 Yanez (E), Lobos (P), Diaz (G) and Ballester (D). Effect of roasting on the chemical composition and protein quality of lupin seeds (**Lupinus albus** cv Multolupa). **Journal of Food Science** 51(5); 1986; 1235-1238

The effect of roasting lupin seeds for 10, 20, 30 and 40 min. at 80 to 90 C, on the stability of essential amino acids and the protein quality was studied. Roasting the seeds up to 40 min caused a severe reduction in lysine, methionine and cystine the reduction being gradual in relation to the roasting time. PER of the diet containing 10 min roasted sample was 0.92, while that of raw flour was 0.9. Heating for longer than 10 min caused a reduction in the PER values. Significant improvement was brought about in these values after supplementing the diets with methionine. Heat treatment of the lupin seeds under mild condition (roasting for 10 min) may improve the palatability and destruction of antinutritional factors. OES

Mesquites

969 Del Valle (FR), Marco (E), Becker (R) and Saunders (RM). Preparation of a mesquite (**Prosopis** Spp.) pod enhanced protein reduced fiber fraction. **Journal of Food Science** 51(5); 1986; 1215-1217

Raw, extruded (alone and a 50/50 blend with soybeans) or toasted mesquite (**Prosopis** spp.) pods were passed 1 and 4 times through an Alpine pin mill, and the resulting ground products separated into different sieve fractions. Protein concn. and recovery were max. and fiber content min. in the fines. Max. protein concn. and recovery were obtained in extrusion runs; of the remaining two runs, toasted pods gave higher protein recovery, but lower protein concn. in the fines, than raw pods. AA

Peas

970 Naczk (M), Rubin (LJ) and Shahidi (F). Functional properties and phytate content of pea protein preparations. **Journal of Food Science** 51(5); 1986; 1245-1247

The functional properties of a pea protein preparation were evaluated; its chemical composition, solubility, water and fat absorption, emulsifying activity as well as the P and phytate content were favourably comparable with those of a wheat gluten, a soy protein isolate and conc. UES

971 Osei-Yaw (A) and Powers (JR). Batter properties of yellow pea flour with respect to **akla** preparation. **Cereal Chemistry** 63(6); 1986; 506-511

The batter properties of yellow pea (**Pisum sativum**) flours were studied with respect to **akla**, a popular West African deep-fat fried product, normally made with cowpeas. Dehulling decreased batter sp. gr. and thus, increased batter vol. Screen size used during grinding did not greatly affect flour particle size distributions or batter apparent viscosities but significantly affected batter sp. gr. Oil uptake by akla increased linearly with the moisture content of the batter. Sensory panel scores showed no significant difference in preference for **akla** made from cowpeas or yellow peas among American panelists. African panelists preferred cowpea **akla**. AA

OILSEEDS AND NUTS

Cottonseeds

972 Del Valle (FR), Escobedo (M), Ramos (P), De Santiago (S), Becker (R), Bourges (H), Rhee (KC), Choi (YR), Vega (M) and Ponce (J). Preparation of low free gossypol and high available lysine cottonseed soybean blends. **Journal of Food Science** 51(5); 1986; 1242-1244

This study reports of a blend with chemical and nutritional properties similar to those of full fat soy flour, but of low cost. It could be prepared by blending 50% defatted cottonseed meal with 50% extruded full-fat soybean flakes and grinding in an Alpine mill. UES

973 Heywood (R), Lloyd (GK), Majeed (SK) and Gopinath (C). The toxicity of gossypol to the male rat. **Toxicology** 40(3); 1986; 279-284

When (+) gossypol acetic acid was administered to male Sprague-Dawley rats for 26 wk, the most significant toxicological finding was marked suppression of body wt. gain in rats receiving 25 mg/kg/day. Minor biochemical changes were noted at this dosage level. Terminal studies showed 6 out of 20 rats receiving 25 mg/kg/day to have varying degrees of testicular pathology. Five mg/kg/day was shown to be a "no effect" level. AA

Groundnuts

974 Wei (C-I), Tan (H), Fernando (SY) and Ko (NJ). Inhibitory effect of $Beta$-ionone on growth and aflatoxin production by **Aspergillus parasiticus** on peanuts. **Journal of Food Protection** 49(7); 1986; 515-518

Volatile $Beta$-ionone showed a dose related inhibition of fungal growth and aflatoxin inhibitors production on peanuts, though temporarily. This observation was confirmed by microscopic detection of mycelial fragments in peanut limes. MVG

975 Wilson (PW), Gorny (JR), Blackmon (WJ) and Reynolds (BD). Fatty acids in the American groundnut (**Apios americana**). **Journal of Food Science** 51(5); 1986; 1387-1388

The fatty acid profile of lipids extracted from the seeds and tubers of American groundnuts (**Apios americana**) were analysed using GLC. The lipid content of the seed ranged from 12.1 to 18.4% and that of the tuber, 4.1 to 4.6%, on dry wt. basis. The predominant fatty acid in both the cases was linoleic acid. The wide variation found in the lipid composition of the groundnuts could be due to differences in genetic make up, environment, maturity or a combination of all these factors. OES

Palms

976 Kershaw (SJ) and Hardwick (JF). Evaluation of the ISO 659 (1979) method for determination of the oil content. **Oleagineux** 40(11); 1985; 557-562

The extreme hardness and mechanical retention of oil in the seed cell structure of the palm kernel (**Elaeis guineensis** Jacq.) make this oilseed a suitable test material with which to gauge the effectiveness of any method for detn. of the oil content of oilseeds. The ISO 659(1979) method for the detn. of oil content by solvent extraction was investigated in regard to its applicability to palm kernels. The method could be applied successfully with only limited modification but some aspects of the standard do require amendment for the method to be wholly practical. AA

Pumpkin seeds

977 Lazos (ES). Nutritional, fatty acid, and oil characteristics of pumpkin and melon seeds. **Journal of Food Science** 51(5); 1986; 1382-1383

The proximate composition of pumpkin and melon seeds and the fatty acid composition and chemical characteristics of the oil extracted from the seeds were reported. OES

Sesame

Tehineh

978 Ayaz (M), Sawaya (WN) and Al-Sogair (A). Microbiological quality of **Tehineh** manufactured in Saudi Arabia. **Journal of Food Protection** 49(7); 1986; 504-506

Fifty **Tehineh** (a product obtained by the milling of dehusked and roasted white sesame seeds) from 10 processing plants in Saudi Arabia were examined for aerobic plate counts (APC) and counts of coliforms, **Staphylococcus aureus**, **Bacillus cereus**, **Clostridium perfringens**, molds and yeasts and detection of salmonella using standard procedures. APC in the product ranged from 20 to 170 000 CFU/g. The range in counts for coliforms, **S. aureus**, **B. cereus**, **C. perfringens**, and molds and yeasts were < 10 to 300, < 10 to 400, < 10 to 250, < 10 to 100, < 10 to 120 and < 10 to 50 CFU/g resp. Out of 10 processing plants, two (20%) were positive for four **Salmonella** serotypes, **S. hadar**, **S. agona**, **S. cinsbuettel** and **S. brecht**; **S. hadar** was the most predominent. Results suggested that **Tehineh** presents a microbiological health hazard. MVG

Soybeans

979 Friedman (M) and Gumbmann (MR). Nutritional improvement of soy flour through inactivation of trypsin inhibitors by sodium sulphite. **Journal of Food Science** 51(5); 1986; 1239-1241

Treatment of raw soy flour at 75 C with 0.03M sodium sulphite for 1 h completely inactivated trypsin inhibitors leaving no sulphite residues in the soy proteins. Rat feeding studies showed that the protein efficiency ratio (PER) increased from 1.55 for raw flour to 2.11 for heated flour and 2.49 for flour heated in the presence of sulphite.

980 Lu (JY) and Al Jasser (MS). Characteristics and acceptability of a flour prepared from sodium bicarbonate soaked and steamed soybeans. **Journal of Food Processing and Preservation** 10(3); 1986; 177-187

A soy flour was prepared by soaking the beans in 9 volumes of 0.5% sodium bicarbonate overnight (pH 8.5), steamed at 100 C for 30 min, dried at 50-60 C under vacuum, then ground to flour. The flour had a light tan colour and no objectional beany odour. The composition of the flour was 48% protein, 19% flour, 5% ash, and 3.5% moisture. No lipoxygenase nor antitrypsin activity was detected in the flour. The phytate content was 0.75%. Protein solubility, emulsifying capacity, foaming capacity, oil and water absorption of the flour was determined. The results showed that the flour prepared from biocarbonate soaked and steamed soybeans possessed desirable functional characteristics except protein solubility was decreased. Two products, noodles and bread, were prepared by using the soy flour as an ingredient. Sensory evaluation of the products revealed that both products were well accepted. AA

981 Sato (K), Yamagishi (T) and Yamauchi (F). Quantitative analysis of soybean proteins by densitometry on gel electrophoresis. **Cereal Chemistry** 63(6); 1986; 493-496

Soy products

982 Hung (TV), Kyle (WSA) and Yu (RS. -T). Incorporation of lupin in soybean curd production. **ASEAN Food Journal** 2(1); 1986; 37-38

A simple method for producing milk and bean curd product from a blend of soybean and lupin seeds was reported. Up to 30% by wt. of lupin seed could be incorporated in the bean curd production without any apparent adverse effect on yield and texture of the product. Infact, the lupin-soybean curd produced was of the same yield and quality as the 100% soybean curd. A 20-30% saving in material cost was reported without any increase in capital expenditure. OES

TUBERS AND VEGETABLES

Root vegetables

Beet

983 Balwinder Sawhney, Kawatra (BL). Supplementary value of beet (**Beta vulgaris**), knol-khol (**Brassica oleracea**) and turnip (**Brassica rapa**) greens on the protein quality of wheat chapati. **Journal of Food Science and Technology, India** 23(6); 1986; 311-315

Sag prepared from beet, knol-khol and turnip greens by mixing with garlic, onion, maize flour, salt, chillies and ghee was cooked and fed along with chapati (1:4 ratio) to rats for 4 wk at 9% protein level. Proximate composition of chapati and sag from greens were determined; the protein content of sags ranged from 15.6 to 21.3% on dry basis. The ascorbic acid content of cooked dehydrated sags varied from 297.9 to 497.8 mg/100 g and the losses of ascorbic acid due to cooking and drying were 35.5 to 46.8%. \$Beta\$-carotene contents of cooked sags was 3204 to 6119 µg/100 g on DM basis. Lysine content of sag from greens varied from 4.72 to 5.37 g/16 gN. Supplementation of wheat chapati with sags in the ratio of 4:1 improved PER of wheat chapati from 1.21 to 1.65 in beet sag, and 1.53 in knol-khol whereas when turnip sag was supplemented the PER was less than wheat chapati fed alone. KAR

Carrots

984 Bawa (AS) and Saini (SPS). Effect of method of preservation on the storage quality of carrot juice. **Indian Food Packer** 41(1); 1987; 42-46

Carrot juice was either (i) pasteurized at 80 C cooled, added 600 p.p.m. of sodium benzoate and bottled or (ii) treated at 80 C, hot filled in 160 ml glass bottles, corked, heat processed in boiling water for 15 min and cooled. Bottled juices of (i) and (ii) were stored at room temp. (22-35 C) and under refrigeration (2-5 C) for six months and analysed for physico-chemical characteristics at one month intervals. The yield of juice was 37.1% and it was low in acidity (0.11%) and soluble solids (7.8%) content. The juice was added with sugar and acid before bottling. Soluble solids, acidity and pH remained constant during storage at both temp. In (i), storage at higher temp. increased the reducing sugars (2.81 to 4.4%); in (ii) acidity decreased with increase in pH at higher temp. storage. Total sugars decreased in (ii) at both the temp.; reducing sugars increased at higher temp. storage. The study indicated that during storage the changes were more at higher temp. irrespective of the pretreatment given. The overall taste and flavour of toned and 6 months stored juice was more acceptable than the fresh raw juice which was rated insipid. Pretreatment (i) or (ii) or storage temp. did not influence the consumer acceptability of the juice. KAR

Tubers

Bamboo shoots

985 Pravabati Devi (S) and Tombi Singh (H). Studies on the chemical and nutritional changes of bomboo shoots during fermentation. **Journal of Food Science and Technology, India** 23(6); 1986; 338-339

Sugars, acids and protein content of tender raw (Nat) and 3- and 5-day fermented tender bamboo (**Melocanna humilis**) shoots (Shoidon) and the biochemical changes during fermentation for 2, 5, 8 and 11 days were determined. During the 5-day fermentation period pH decreased (6.7 to 3.2) protein content increased from 3.10 to 8.10 mg/100 g, total sugars decreased from 78.40 to 18.50 mg/100 g and ascorbic acid increased from 0.46 to 0.55 mg/100 g. 3-day fermented shoidon was highly acceptable due to its flavour and acidity as compared to raw and 5-day fermented samples. KAR

Potatoes

986 Toma (RB), Leung (HK), Augustin (J) and Iritani (WM). Quality of French fried potatoes as affected by surface freezing and specific gravity of raw potatoes. **Journal of Food Science** 51(5); 1986; 1213-1214, 1357

The effect of partial freezing of potato strips before blanching on quality of French fries produced from Russel Burbank potatoes of different sp. gr. was reported. Despite the lower ascorbic acid retention the partial freezing treatment was a promising technique in producing good quality French fries, especially for potatoes stored for an extended period and containing large amounts of reducing sugars. OES

Vegetables

987 Drake (SR) and Carmichael (DM). Frozen vegetable quality as influenced by high temperature short time (HTST) steam blanching. **Journal of Food Science** 51(5); 1986; 1378-1379

This comparative study revealed that high quality frozen vegetables could be produced with high temp. short time (HTST) steam blanching, but quality was dependant upon the particular vegetable and pressure and time of the HTST steam blanch. OES

988 Sanchez-Marroquin (A), Del Valle (FR), Escobedo (M), Avitia (R), Maya (S) and Vega (M). Evaluation of whole Amaranth (**Amaranthus cruentus**) flour, its air classified fractions, and blends of these with wheat and oats as possible components for infant formulas. **Journal of Food Science** 51(5); 1986; 1231-1234, 1238

Whole Amaranth seed flour, its air classified fractions and extruded blends of these with wheat and oats were chemically and nutritionally analysed. The 50:50 and 60:40 blends of whole seed as well as of the protein rich air-classified fractions with oats were found to possess characteristics which make them highly suitable for use in the development of low cost infant formulae. The amino acid profiles and chemical score of the protein quality of these blends compared well with that of the reference protein. OES

989 Sastry (CSP) and Vijaya (D). Spectrophotometric determination of fenitrothion and methylparathion in formulations and its residues on vegetables and fruits. **Journal of Food Science and Technology, India** 23(6); 1986; 336-338

A rapid and accurate method for the detn. of μg quantities of fenitrothion and methylparathion in fruits and vegetables based on their ability to form water soluble coloured complex with sodium nitroprusside-hydroxylamine has been proposed. The intensities of the colours were measured at 490 and 510 nm for fenitrothion and methylparathion resp. The optimum conditions such as concn. of sodium nitroprusside, hydroxylamine hydrochloride and sodium hydroxide, order of addition of reagents and stability of the colour were established. The recovery % of the insecticide from fortified samples of cabbage, tomato, carrot and potato ranged from 91.15 to 98.96% for methylparathion and 91.67 to 97.22% for fenitrothion. KAR

Cucumbers

990 Naewbanij (JO), Stone (MB) and Fung (DYC). Growth of **Lactobacillus plantarum** in cucumber extract containing various chloride salts. **Journal of Food Science** 51(5); 1986; 1257-1529, 1275

Systems similar to the environment of pure-culture inoculation and the natural process of cucumber fermentation were used to study the capabilities of some salt substitutes including potassium chloride, calcium chloride, and magnesium chloride to provide a selective environment for the growth of **Lactobacillus plantarum**, a desirable sp. in cucumber fermentation. The salt that gave the highest percentage of **Lactobacillus** in the total microbial population was considered to provide the most selective environment for the desirable organisms in cucumber fermentation. Salts that provided the most selective environment were NaCl and KCl in the filtered, raw cucumber extract and KCl in the heated and filtered extract. Calcium chloride was more selective than magnesium chloride in either medium.

Leafy vegetables

Quinoa

991 Reichert (RD), Tatarynovich (JT) and Tyler (RT). Abrasive dehulling of quinoa (**Chenopodium quinoa**): Effect on saponin content as determined by an adapted hemolytic assay. **Cereal Chemistry** 63(6); 1986; 471-475

Okra

992 Stone (MB), Toure (D), Greig (JK) and Naewbanij (JO). Effects of pretreatment and dehydration temperature on colour, nutrient retention and sensory characteristics of okra. **Journal of Food Science** 51(5); 1986; 1201-1203

Moisture content, water activity, colour and concn. of ascorbic acid and thiamin of blanched (boiling water, with/without 0.1% sulphur dioxide) and unblanched okra, dried for 10 h at 63 C or 14 h at 52 C were determined, before and after 5 wk storage at ambient temp. No differences were observed among samples after dehydration and upon storage. Blanching with and without sulphur dioxide produced samples with higher water activity ($P < 0.5$) which remained unchanged after 6 wk storage. The low water activity of the unblanched samples increased after storage and compared well with the stored blanched samples. Blanching in boiling water, with or without sulphur dioxide, protected the characteristic flavour of okra. Blanching with sulphur dioxide produced greater ascorbic acid retention, but a substantial loss of thiamin. Blanching in boiling water produced the opposite effect. OES

Tomatoes

993 Long (AR) and Chism (GWIII). Cytokinin (18-14$_{C}$) benzylaminopurine metabolism in mature green tomato pericarp. **Journal of Food Biochemistry** 10(2); 1986; 133-147

994 Purnima Sinha, Saxena (SK). Effect of treating tomatoes with leaf extract of **Lantana camara** on development of fruit rot caused by **Aspergillus niger** in presence of **Drosophila busckii**. **Indian Journal of Experimental Biology** 25(2); 1987; 143-144

Healthy tomato fruits after inoculation with **Aspergillus niger** were treated with leaf extract of **L.camara** at 1.0 and 0.1% level. Adults of **Drosophila busckii** were released at 10, 20, and 30 min intervals after treatment. Observations made after 2, 5, 7, 10 and 15 days indicated no rotting or damage upto 15 days in fruits treated with leaf extract and fed with insect alone, and in fruits treated after inoculation with A. niger upto 10 days. The efficacy of the extract decreased with increase in dilution. However, rotting took place in fruits treated with leaf extract prior to inoculation. Aggravation of the rotting of fruits in presence of insect was less in fruits treated with leaf extract after fungus inoculation. AA

995 ✓ Radhakrishnaiah Setty (G), Chikkappaji (KC), Madiah (N), Nanjunda Swamy (AM), Raghuvir (KG), Dhanaraj (S) and Patwardhan (MV). Screening of the suitability of Bulgarian varieties of tomatoes for processing into juice, ketchup and tomato paste. **Indian Food Packer** 41(1); 1987; 7-16

Tomato juice was extracted from four Bulgarian var. ((i) Preslav, (ii) Hebros, (iii) Prista and (iv) Druzbha) and two Indian var. ((a) Selection-4 and (b) Pusa Ruby) and canned and ketchup and paste were also prepared to find out the suitability of these var. Crop yield was max. with (i), (ii) and (b). Uniform ripening was noted with (iii), (iv) and (a). Yield of juice ranged from 86.7 to 91.0% with Bulgarian var. and 83.9 to 87.9% with Indian var. Pulp content was high with (iii), (a) and (b). Yield (kg) of ketchup with 25 kg of juice was 10.0, 10.5, 10.7 and 11.10 with (i), (ii), (iii) and (iv) resp. and was 10.7 with (a) and 11.6 with (b). Yield of paste (based on 25% dry solids) ranged from 14.4 to 16.9% with Bulgarian var. (max. with (iii)) and was 15.2% with (a) and 14.6% with (b). Acidity was high (2.38 to 3.30%) with Indian var. than with Bulgarian var. (1.9 to 2.6%). Lycopene content (mg %) of tomato paste was 9.3 for (i), 12.02 for (ii), 12.52 for (iii) and 11.87 for (iv) whereas it was 10.76 for (a) and 9.35 for (b). Based on the rank sum analysis for individual quality factors and overall quality the most suitable var. were Prista for tomato paste; Prista, Druzbha and Selection-4 for juice and Prista and Selection-4 for ketchup preparation. KAR

FRUITS

Apples

996 Liu (FW) and Ci (L - J). Responses of diaminozide-sprayed 'McIntosh' apples to various concentrations of oxygen and ethylene in simulated CA storage. **Journal of the American Society for Horticultural Science** 111(3); 1986; 400-403

A storage atmosphere of 2+3 (2% oxygen) and 3% Carbon dioxide and < 1 μ l k^{-1} ethylene, kept apples firm without injury or off flavour and with very low rates of ethylene production. This may be ideal for low-ethylene CA storage of diaminozide-sprayed McIntosh apples. KAR

997 Liu (FW) and Samelson (D). Rates of change in firmness, acidity, and ethylene production of 'McIntosh' apples in simulated low-ethylene CA storage. **Journal of the American Society for Horticultural Science** 111(3); 1986; 404-408

Apples sprayed with 1000 or 2000 mg l^{-1} diaminozide were stored in simulated low-ethylene controlled atmosphere (CA) for 7.5 and 9.5 months. The simulated CA was a flow-through system with 2.5-3% oxygen, 3.5% carbon dioxide, <1 ul^{-1} ethylene, 2.2 to 3.3 C and 90-95% relative humidity. The rates of ethylene production of these apples were very low in the first 4 months, gradually increased thereafter, but remained < 0.5 ul kg^{-1}/h^{-1} for atleast 7 months. Apples which were harvested within 10 days after the onset of autocatalytic ethylene production, lost < 10% of their original firmness, 27-29% of acidity, and 0 % of soluble solid after 7-5 months of storage. The low ethylene CA effectively preserved the quality and inhibited the ethylene production of McIntosh apples. KAR

998 Rouchaud (J), Moons (C) and Meyer (JA). Effects of fungicide treatments on the gustative quality and the biochemical composition of apples. **HortScience** 21(4); 1986; 1056-1058

The total sugar content of Golden Delicious orange could be increased by 22% using fungicide treatment. The distribution of sugars, the acidity of the apple juice, and the gustative quality also changed with fungicide treatments. The biochemical composition and the gustative quality of Cox's Orange Pippin' apples did not change with the fungicide treatments. KAR

Citrus fruits

Grapefruit

999 Berry (RE) and Tatum (JH). Bitterness and immature flavour in grapefruit: Analyses and improvement of quality. **Journal of Food Science** 51(5); 1986; 1368-1369

Coumarin concn. was very high in early grapefruit juice that had an undesirable "immature" or "greenish" flavor. Thirteen coumarins and psoralens were isolated and identified from such early juices. Specific compounds added to mature Duncan juice caused [Bcreases in astringency, sourness and bitterness. About 35% of the naringenin-7-beta-rutinoside and 80% of the hesperidin were removed along with most suspended pulp when such juices were centrifuged. TLC analysis of insoluble solids indicated over 50% of five coumarins and about 25% of five other compounds were removed. Overall flavour quality of grapefruit juice was improved following centrifugation. AA

Grapes

1000 Narasimham (P), Vijayendra Rao (AR), Dhanaraj (S), Mallikarjunaradhya (S), Krishnaprakash (MS), Habibunnisa, Ananthakrishna (SM). Effect of grape guards and inpackage fumigants under different packaging conditions on the control of spoilage during transport and on quality of 'Tash Ganesh' seedless grapes. **Indian Food Packer** 41(1); 1987; 55-65

To prevent the spoilage of grapes during transport, four sulphur dioxide and fumigant release systems comprising ((i) grape guards-slow release system, (ii) grape guards quick release system, (iii) inpackage fumigant - slow release system, and (iv) inpackage fumigant combination of slow and quick release system were tried on 4 kg capacity corrugated fibre board (CFB) containers namely, unventilated LDPE (100 guage) liner (384 holes of 0.5 cm diameter in 21 x 41 in. size LDPE sheet) (P_2), laminated sheet of polycoated/paper (P_3) and conventional package of CFB box (P_4). Grapes after transportation for 4 days over 1400 km by truck and by train were analysed for physical, chemical and sensory characteristics. The visual appearance of berries, and stalks as also the spoilage are controlled by the release of sulphur dioxide and the treatments could be ranked as (IV) = (III) (I) = (II). Type of package did not affect the berry drop and infection of berries. High intact good bunches and low disease in berries were observed in (III) and (IV). The soluble solids content and acidity were not affected by sulphur dioxide treatment. Although the sensory evaluation data showed better quality fruits in slow release in package fumigant but a combination of slow and quick release (IV) is preferable for grape transportation over 4 days under tropical conditions. KAR

Litchi

1001 Jaiswal (PP), Sah (NL) and Prasad (US). Regulation of colour break during litchi (**Litchi chinensis** Sonn.) ripening. **Indian Journal of Experimental Biology** 25(1); 1987; 66-72

Pigmentation changes in fruit rind of two litchi cv. Deshi (early maturing) and cv. Kasba (late maturing) have been studied during ripening on the tree and then under storage at 10-12 C. Chlorophyll loss occurs with ripening along with active synthesis of flavonoids, in particular anthocyanins. Anthocyanin concn. increases up to fully ripe stage. Kinetin treatment of partially ripe fruit causes chlorophyll retention and a lower level of total anthocyanin which increases at senescence. Cycloheximide retards chlorophyll breakdown as well as development of red pigmentation, apparently through inhibition of synthesis of enzymes involved. However, chlorophyll loss with advancing senescence suggests non-enzymatic operation. In addition to the flavonoids present in control fruit, kinetin-treated fruits have quercetin-5-glucoside, while cycloheximide treated fruits have quercetin-5-glucoside as well as a derivative of quercetagetin. These addition compounds probably serve as intermediates in flavonoids synthesis. AA

1002 Sharma (SB) and Ray (PK). Studies on extending post-harvest life of litchi (**Litchi chinensis** Sonn). **Indian Food Packer** 41(1); 1987; 17-20

Fresh litchi fruits were dipped for 30 min separately in 25, 50, and 100 p.p.m. of calcium chloride, calcium sulphate, Broax, manganese sulphate, copper sulphate, Bavistin, and 5, 10 and 20 p.p.m. of kinetin, and packed in perforated polythene bags (100 gauge) after air drying. Min. loss in wt. during storage was found with 100 p.p.m. of Borax (10.5%), followed by 25 p.p.m. of calcium chloride (11.0%) and 50 p.p.m. of copper sulphate (12.0%). Browning and rotting were min. in 25 p.p.m. of copper sulphate followed by 25 and 50 p.p.m. of Bavistin. Soluble solids content of all the fruits increased during storage, max. being with 100 p.p.m. of calcium chloride (22.6%). Max. storage period of 10.5 and 11.5 days was observed with those treated with 50 and 100 p.p.m. of borax, resp. Bavistin also preserved the fruits for 10.5 days at 50 and 100 p.p.m. The storage life was less with other chemicals. KAR

Mangoes

1003 Isaacs (AR). The freezing of mango slices (**Mangifera indica** var. Kensington). **Food Technology in Australia** 38(9); 1986; 383-385

'Kensington' mango slices were frozen with sucrose syrup, with dry sucrose and without sugar addition, using blast freezing at - 30 C, and still air freezing at - 18 C. According to taste panel assessment, slices frozen in syrup were best. The blast-frozen slices had a higher texture score than the still air-frozen slices. AA

Pears

1004 Blankenship (SM) and Richardson (DG). ACC and ethylene levels in 'd' Anjou' pears in air and controlled-atmosphere storage. **HortScience** 21(4); 1986; 1020-1022

Saskatoon berries.

1005 Mazza (G). Anthocyanins and other phenolic compounds of saskatoon berries (**Amelanchier alnifolia** Nutt.) **Journal of Food Science** 51(5); 1986; 1260-1264

On the basis of HPLC, paper chromatography and spectral analysis, 13 phenolic compounds were found in Saskatoon berries. The major anthocyanins were cyanidine 3 galactoside which formed 61% and cyanidine 3 glucoside which accounted for 2% of the total anthocyanins which amounted to 86-125 mg/100 g fresh berries. Non-anthocyanin phenolic compounds positively identified were chlorogenic acid and rutin. OES

CONFECTIONERY, STARCH AND SUGAR

Starch

Polysaccharides

1006 Koseki (M), Kitabatake (N), Doi (E), Yasuno (T), Ogino (S), Ito (A) and Endo (F). Determination of pectin in the presence of food polysaccharides. **Journal of Food Science** 51(5); 1986; 1329-1332

A selective and simple method to assay pectin in a mixture of polysaccharides using pectinase was developed. The assay was not affected by the presence of agar and gums of tragacanth, karaya and guar and locust bean in the mixture. Alginate and xanthan gum repressed the colour development, but this could be overcome by increasing the pectinase concn. to 0.4% and changing the pH to 4.5. OES

Sugar

1007 Smith (JS), Villalobos (MC) and Kottemann (CM). Quantitative determination of sugars in various food products. **Journal of Food Science** 51(5); 1986; 1373-1375

128 processed food products were subjected to high pressure liquid chromatography to quantitate 5 specific sugars-glucose, fructose, sucrose, maltose and lactose. OES

Bagasse

1008 Juanbaro (J) and Puigjaner (L). Saccharification of concentrated brewing bagasse slurries with dilute sulphuric acid for producing acetone-butanol by **Clostridium acetobutylicum**. **Biotechnology and Bioengineering** 28(10); 1986; 1544-1554

Molasses

1009 Oderinde (RA), Ngoka (LC) and Adesogan (EK). Comparative study of the effect of ferrocyanide and EDTA on the production of ethyl alcohol from molasses by **Saccharomyces cerevisiae**. **Biotechnology and Bioengineering** 28(10); 1986; 1462-1465

Production of ethyl alcohol was more sensitive to ferrocyanide than to EDTA. Ferrocyanide, introduced into the cultures at the time of inoculation, stimulated ethyl alcohol production; 261 p.p.m. of ferrocyanide produced max. effect which was 3% more than in control cultures. It, however, depressed ethyl alcohol production by 4% max. when introduced during the propagation of yeast while EDTA stimulated ethyl alcohol production by 2 %. No significant effect was noticed on ethyl alcohol production when ferrocyanide was added during fermentation while EDTA, over a wide range of concn. caused a steady increase in alcohol yield. MVG

BAKERY PRODUCTS

Bread

1010 Barnes (PJ) and Lowy (GDA). The effect on baking quality of interaction between milling fractions during the storage of wholemeal flour. **Journal of Cereal Science** 4(3); 1986; 225-232

The vol. of bread baked from wholemeal flour by a mechanical dough development procedure (Chorleywood Bread Process) decreased during storage of the flour at + 20 C for 20 wk. Storage of 3 individual milling fractions allowed interactions between the endosperm and non-endosperm fractions to be detected. The germ stored at + 20 C caused no deterioration in baking quality of reconstituted 'wholemeal' whereas the bran and white flour fractions gave only small decreases in loaf vol. (5% and 3% resp. after 27 wk) although the fatty acid content of each fraction was very high after storage at + 20 C. Combination of all three + 20 C fractions before baking resulted in a further 5% decrease in loaf volume, indicating an interaction between the stored fractions during breadmaking. A much greater effect on loaf volume (total decrease of 27%) was observed when the streams were blended together before storage, showing that a more significant interaction occurred during storage. A lipid interchange experiment using flours blended before and after storage showed that the extracted lipid fraction could account for a part of the decrease in baking quality but that the unextracted flour residue was also involved. AA

Cakes

1011 Ebeler (SE), Breyer (LM) and Walker (CE). White layer cake batter emulsion characteristics: Effects of sucrose ester emulsifiers. **Journal of Food Science** 51(5); 1986; 1276-1279

Alpha-mono-/diglyceride emulsified batters had the highest sp. gr. nonemulsified batters had the lowest sp. gr.; and sucrose ester emulsified batters were intermediate, varying with the hydrophil-lipophil balance of the emulsifier. Sucrose ester emulsified batters generally exhibited pseudoplastic viscosity characteristics with viscosities and flow rates falling between those of the nonemulsified batter and the Alpha-mono/diglyceride emulsified batter. The addition of sucrose esters resulted in cakes with vol. greater than when no emulsifier was used. However, the sucrose ester emulsified cake shrank from the edge of the pan and collapsed upon cooling, exhibiting a very flat profile. AA

Pasta

Noodles

1012 Khandker (AK), de Mosqueda (MB), del Rosario (RR) and Juliano (BO). Factors affecting properties of rice noodles prepared with an extruder. **ASEAN Food Journal** 2(1); 1986; 31-35

In the preparation of noodles from dry milled IR 42 rice flour with a single screw press extruder gel consistency softened and gel viscosity decreased progressively with increasing extrusion temp. and decreasing batter moisture level, without any decrease in amylose content. Gel consistency and viscosity correlated significantly with other noodle properties. Hardness of cooked noodles was related to the amylose content in 8 rice var. extruded at 35% moisture at 55 C. OES

Spaghetti

1013 Matsuo (RR), Dexter (JE), Boudreau (A) and Daun (JK). The role of lipids in determining spaghetti cooking quality. **Cereal Chemistry** 63(6); 1986; 484-489

MILK AND DAIRY PRODUCTS

Milk

1014 Kessler (HG) and Fink (R). Changes in heated and stored milk with an interpretation by reaction kinetics. **Journal of Food Science** 51(5); 1986; 1105-1111

The effects of heating and storage conditions on the chemical changes in milk such as the loss of thiamine and lysine and the formation of hydroxymethyl furfural were studied and the reaction kinetics were worked out. All changes could be described by one equation which was valid over a wide range of time and temp. (from second upto year, from 4 C upto 160 C and which gave straight lines in the Arrheneus plot log time = f (1/absolute temp.) . OES

1015 Khayat (FA) and Richardson (GH). Detection of abnormal milk with impedance microbiology instrumentation. **Journal of Food Protection** 49(7); 1986; 519-522

Ability of impedance microbiology instrumentation to differentiate between milk samples having different conductivities due to mastis was showed. Results showed that a conductance instrument simultaneously detected both abnormal and microbial activity in raw milk. MVG

1016 Muir (DD), Griffiths (MW), Phillips (JD), Sweetsur (AWM) and West (IG). Effect of the bacterial quality of raw milk on the bacterial quality and some other properties of low-heat and high-heat dried milk. **Journal of the Society of Dairy Technology** 39(4); 1986; 115-118

Quality of powder is largely not related to raw milk quality and is determined by the heat treatment applied during manufacture. Nevertheless, evidence is presented which suggests that raw milk with bacterial counts greater than 2 x 10^6 colony forming units per ml should not be used for the manufacture of powders to be used for recombination. KAR

1017 Zall (R), Chen (J) and Fields (SC). Evaluation of automated time temperature monitoring system in measuring freshness of UHT milk. **Dairy and Food Sanitation** 6(7); 1986; 285-290

Aspects covered are: detn. of the shelf-life of UHT milk stored at refrigerated and non refrigerated temp., detn. of the effects of shipments in commercial carriers on the quality of UHT milk; and the evaluation of the effectiveness of the lifelines inventory management system in measuring the freshness and shelf life of UHT milk. BV

Butter

1018 Satish Kulkarni) and Rama Murthy (MK). Comparison of rheological characteristics of cow and buffalo cream butter. **Journal of Food Science and Technology, India** 23(6); 1987; 331-332

Rheological characteristics like penetration value, extruder thrust, extruder friction, oiling off, viscosity and yield stress of cow cream butter (CCB) and buffalo cream butter (BCB) were measured at 5 and 15 C as also the free fatty acid composition. CCB showed lower extruder friction than BCB; this difference was higher at higher temp. Other rheological characteristics like penetration value, extruder thrust, oiling off, viscosity and yield stress were similar in CCB and BCB at both the temp. The milk fats of BCB and CCB differed significantly in fatty acid composition, triglyceride and high melting glyceride contents. The buffalo milk fat is harder than cow milk fat because of its higher concn. of long chain saturated fatty acids 16:1

and 18:1. KAR

Casein

1019 Shimizu (M), Lee (SW), Kaminogawa (S) and Yamauchi (K). Functional properties of a peptide of 23 residues purified from the peptic hydrolyzate of $Alpha$ s1-CASEIN: Changes in the emulsifying activity during purification of the peptide. **Journal of Food Science** 51(5); 1986; 1248-1252

Cheese

1020 Kaminogawa (S), Yan (TR), Azuma (N) and Yamauchi (K). Identification of low molecular weight peptides in Gouda-type cheese and evidence for the formation of these peptides from 23 N-terminal residues of $alpha$S1-casein by proteinases of **Streptococcus cremoris H61. Journal of Food Science** 51(5); 1986; 1253-1256, 1264

1021 Tanaka (N), Traisman (E), Plantinga (P), Finn (L), Flom (W), Meske (L) and Guggisberg (J). Evaluation of factors involved in antibotulinal properties of pasteurized process cheese spreads. **Journal of Food Protection** 49(7); 1986; 526-531

Pasteurized process cheese spreads with various levels of NaCl, disodium phosphate, moisture and pH were challenged with **Clostridium botulinum** type A and B spores and the response was tested by response surface methodology and confirmed by supplemental experiments. Results showed that the lower moisture and pH gave a safer product. Higher NaCl produced safer products. Higher moisture products could be produced safely if pH was low enough and the NaCl plus phosphate concn. were high enough. It was concluded that no single factor was responsible for the safety of unsterilised pasteurised process cheese spreads. Combinations of the above factors were developed for safe pasteurised cheese spreads containing upto 60% moisture. MVG

Paneer

1022 Sachdeva (S), Singh (S) and Kanawjia (SK). Recent developments in **Paneer** technology. **Indian Dairyman** 37(11); 1985; 501-505

The paper reviews the latest developments and projects future strategy for large scale production of **paneer**. MVG

Ice cream

1023 Smith (DE) and Wittinger (SA). Effect of sweeteners and stabilizers on the structure of ice cream mix as determined by acoustic methods. **Journal of Food Processing and Preservation** 10(3); 1986; 227-235

Various ratios of guar gum to locust bean gum were used with nine combinations of sucrose, 36 DE corn syrup and 42 high fructose corn syrup (42 HFCS) in a standard ice cream formulation. It was demonstrated that differences in the structure (defined as change in adiabatic compressibility) of the mixes could be determined by measuring the acoustic parameters of sound velocity and density. From these parameters adiabatic compressibility was calculated. Data indicated an increase in mix structure when the guar to locust bean gum ratio was increased. The amount of corn syrup had little effect on structure. An increase in 42 HFCS, however, increased the structure. KAR

Milk fats

1024 Munro (DS) and Illingworth (D). Milkfat-based food ingredients: Present and potential products. **Food Technology in Australia** 38(8); 1986; 335-337

The current products - butter, cream, anhydrous milkfat and variations of them - are described. Blending with other fats and oils, fractionation from the milk, and the adoption of margarine manufacturing techniques are proposed as methods for using milk fat. KAR

Milk proteins

1025 Kelly (PM). Dried milk protein products. **Journal of the Society of Dairy Technology** 39(3); 1986; 81-85

The commercial methods of isolation of the main milk proteins marketed in the dried form, casein, caseinates and whey proteins, are described, together with process developments for the production of other types of dried protein. AA

1026 Sharma (BD), Padda (GS) and Joshi (HB). Use of milk proteins in meat products. A review. **Indian Dairyman** 37(11); 1985; 487-491

Research and development activities carried out during the last few years on milk proteins and their utilisation in food industry are reviewed under the following headings. Casein and caseinates; co-precipitates; whey proteins; skim milk powder; combined milk preparations; detection of milk proteins; and regulations regarding use of milk proteins in meat products. MVG

Skim-milk

1027 Kornacki (JL) and Marth (EH). Heat-inactivation of **Streptococcus faecium** var. **Casseliflavus** in skim milk cultures with **Pseudomonas fluorescens**. **Journal of Food Protection** 49(7); 1986; 541-543

Thermal destruction of **Streptococcus faecium** var. **Casseli flavus** (SFC) at 57 C in autoclaved skim milk was determined at several pH values, and when skim milk was inoculated with **Pseudomonas.fluorescens** and incubated 3 days at 10 C plus 4 day at room temp. before SFC was added. The pH values between 6.4 and 6.6 had little effect on heat resistance of SFC. At pH 5.6, however, accelerated thermal destruction occurred in sterile skim milk as compared to skim milk at pH 6.5. (D-values were 4.8 min and 10.21 min, respectively). Presence of large populations (log 10 bacterial count = 9.8 to 9.9/ml) of **P. fluorescens** had a protective effect on SFC (D = 7.6 ± 7 min. in skim milk preincubated with **P. fluorescens** and 6.2 min. in skim milk without **P. fluorescens**). AA

Whey

1028 Moxon (J). New use for whey. **Food Manufacture** 61(8); 1986; 43-45

1029 Srivastava (MK), Trimurtulu (N) and Lohani (PP). Utilization of by-products of dairy industries-whey and butter-milk. **Indian Dairyman** 37(11); 1985; 507-509

Utilisation of whey and butter milk for the preparation of refreshing and nutritious soft drinks through the application of mixed culture of **S. thermophilus** and **L. acidophilous**, has been described. The procedure which does not need any special device is simple, convenient and economical for middle and low cost dairies. The preparations from whey-butter milk mixture scored max. consumer response. MVG

MEAT AND POULTRY

Meat

1030 Flores (HA), Kastner (CL), Kropf (DH) and Hunt (MC). Effects of blade tenderization and trimming of connective tissue on hot-boned, restructured, pre-cooked roasts from cows. **Journal of Food Science** 51(5); 1986; 1176-1179

1031 Miller (MF), Davis (GW), Seideman (SC), Wheeler (TL) and Ramsey (CB). Extending beef bullock restructured steaks with soy protein, wheat gluten or mechanically separated beef. **Journal of Food Science** 51(5); 1986; 1169-1172

Nine blends were formulated from young bullocks to contain 0, 10 or 20% mechanically separated beef (MSB), textured soy protein (TSP) or vital wheat gluten (VWG), (Control = no extender). All blends were analyzed for chemical, sensory and visual properties. Control and extended, restructured steaks were not different in juiciness, tenderness or cohesiveness scores or for calcium content. Blends extended with TSP or VWG had a high incidence of off-flavour and all extended, restructured steaks had less desirable visual properties than control blends. Storage life was not affected by type or level of extender. Restructured steaks extended with MSB were not equal to the control, but were superior to TSP or VWG extended steaks. AA

1032 Ono (K), Berry (BW) and Douglass (LW). Nutrient composition of some fresh and cooked retail cuts of veal. **Journal of Food Science** 51(5); 1986; 1352-1357

This study was conducted to provide nutrient composition data of retail cuts of veal from milk fed and special fed calves, to account for changes in production technology, and also to provide more details than presently available. Values for proximate composition, cholesterol, 8 fatty acids, 8 vitamins and 8 inorganic nutrients were reported. OES

1033 Yasuda (K), Nakamura (R) and Hayakawa (S). Factors affecting heat-induced gel formation of bovine serum albumin. **Journal of Food Science** 51(5); 1986; 1289-1292

Factors affecting heat-induced gel formation of bovine serum albumin (BSA) were studied. In the presence of NaCl (I>0.05), well-developed transparent gels formed on both sides of the isoelectric point (Ip). Addition of Calcium chloride or magnesium chloride greatly suppressed gel formation on the alkaline side of Ip, but increased it a little on the acid side. Intermolecular s-s bonds contributed to the gel formation on the alkaline side of Ip but not on the acid side. From the results of the infra-red spectra measurements intermolecular $Beta$ structure appears to contribute to gel formation on both sides of the Ip.

1034 Zayas (JF) and Naewbanij (JO). The influence of microwave heating on the textural properties of meat and collagen solubilization. **Journal of Food Processing and Preservation** 10(3); 1986; 203-214

The microwave heating of meat samples solubilized more collagen ahan did the conventional method of heating. The data showed significant variations among the samples for per cent hydroxyproline solubilized by microwave heating. Differences in shear cohesiveness and firmness were established for microwave and conventionally heated samples.

Beef

1035 Carr (TP) and Marchello (JA). Microbial changes of precooked beef slices as affected by packaging procedure. **Journal of Food Protection** 49(7); 1986; 534-536

1036 Ghavimi (B), Rogers (RW), Althen (TG) and Ammerman (GR). Effect of nonvacuum, vacuum and nitrogen back-flush tumbling on various characteristics of restructured cured beef. **Journal of Food Science** 51(5); 1986; 1166-1168

1037 Gros (JN), Howat (PM), Younathan (MT), Saxton (AM) and McMillin (KW). Warmed-over flavour development in beef patties prepared by three dry heat methods. **Journal of Food Science** 51(5); 1986; 1152-1155

1038 Kregel (KK), Prusa (KJ) and Hughes (KV). Cholesterol content and sensory analysis of ground beef as influenced by fat level, heating, and storage. **Journal of Food Science** 51(5); 1986; 1162-1165, 1190

The effects of 12 treatment combinations, including 3 fat levels, 2 internal end point temp. and 2 storage periods on the quality, sensory attributes as well as on the cholesterol content of ground beef patties were reported. OES

1039 Munzner (R). Modifying action of vegetable juice on the mutagenicity of beef extract and nitrosated beef extract. **Food and Chemical Toxicology** 24(8); 1986; 847-849

The effect of juices of different vegetables on the mutagenicity of beef extract (with S-9 mix) and nitrosated beef extract (with and without S-9 mix) was examined using the Ames test. All the juices affected the induced mutagenicity of beef extract and nitrosated beef extract in the presence of S-9 mix, but not the mutagenicity of nitrosated beef extract in the absence of S-9 mix. As the vegetable juices appear to affect mutagenicity only in the presence of S-9 mix, it is concluded that the constituents of vegetables do not act directly on the mutagens; the effects are apparently caused by an interaction with the metabolic activation system. AA

1040 Recio (HA), Savell (JW), Leu (R), Cross (HR) and Smith (GC). Effect of degree of connective tissue removal on raw material yield, chemical and sensory characteristics of restructured beef steaks. **Journal of Food Science** 51(5); 1986; 1173-1175

1041 Vallejo-Cordoba (B), Nakai (S), Powrie (WD) and Beveridge (T). Protein hydrolysates for reducing water activity in meat products. **Journal of Food Science** 51(5); 1986; 1156-1161

Soy protein hydrolysates were assessed for their effectiveness as water activity lowering agents. Four protein hydrolysates were prepared. Of all the soy protein hydrolysates in solution at a 20% solids level, the acid-enzyme (A-E) hydrolysate solution had the lowest water activity. When 3.3 - 4.6% of this A-E hydrolysate was incorporated into raw and steamed beef, sausages and broiled beef patties, water activity was reduced to a level equivalent to that for beef with 1% added NaCl. Sensory analysis of broiled ground beef supplemented with 2.5, 5.0 and 10.0% of A-E hydrolysate did not significantly alter the flavour. The A-E hydrolysate may be used as a substitute for sodium chloride in enhancing the shelf life of meat products. KAR

Bovines

1042 Eichhorn (JM), Coleman (LJ), Wakayama (EJ), Blomquist (GJ), Bailey (CM) and Jenkins (TG). Effects of breed type and restricted versus ad libitum feeding on fatty acid composition and cholesterol content of muscle and adipose tissue from mature bovine females. **Journal of Animal Science** 63(3); 1986; 781-794

Pork

1043 Bracewell (AJ), Reagan (JO), Carpenter (JA) and Blankenship (LC). Comparison of sampling methods for isolation of **Campylobacter jejuni coli** from pork skin. **Journal of Food Protection** 49(7); 1986; 532-533, 536

Samples of fresh pork skin were inoculated with known numbers of a nalidixic acid-resistant strain of **Campylobacter jejuni** and sampled by two methods, swabbing and scraping, 10 min. after inoculation to compare sampling methods. The effect of frozen storage of samples on detection was also examined. **C. jejuni** was readily recovered with swab samples while recovery of the organism was greatly reduced by the scrape method. Frozen storage of samples decreased the numbers of viable cells as compared to the fresh samples. AA

1044 Calkins (CR), Goll (SJ) and Mandigo (RW). Retail display lighting type and fresh pork colour. **Journal of Food Science** 51(5); 1986; 1141-1143, 1175

The effects of lighting type on fresh pork colour were studied by displaying chops under delux cool white (DCW), cool white, Surlyn coated (CWSC), or warm white (WW) fluorescent or cool flood (CF) incandescent lights. Initial colour desirability was assessed. Hunter colorimeter values and percentage myoglobin (Mb), oxymyoglobin (OMb) and metmyoglobin (MMb) were detemined over 5 days of display. Light types CF and DCW provided the most desirable colour rendition. Chops displayed under CF lights became darker, had less percentage OMb and greater Mb, and likely had greater microbial growth than other chops due to an increase in chop temp. It appears that CF and DCW lights provide the most desirable colour and that precautions against temp. elevation are needed. AA

1045 Prusa (KJ) and Hughes (KV). Cholesterol and selected attributes of pork tenderloin steaks heated by conventional, convection, and microwave ovens to two internal endpoint temperatures. **Journal of Food Science** 51(5); 1986; 1139-1140

Six treatment combinations for determination of cholesterol and selected quality attributes of pork tenderloin steaks were studied with three oven types (conventional, convection and microwave) and two internal endpoint temp. (71 and 77 C). In general, pork tenderloin steaks heated in the microwave oven had lower evaporative loss and higher drip loss. Cholesterol (wet wt. basis) of the pork steaks was not affected by oven type; however, heating to the higher internal endpoint temp. (77 C) increased (concentrated) the cholesterol. On a dry wt. basis, microwave-heated steaks contained more cholesterol when compared to conventional and convection-heated samples. AA

1046 Shay (BJ) and Egan (AF). Studies of possible techniques for extending the storage life of chilled pork. **Food Technology in Australia** 38(4); 1986; 144-146

Vacuum-packed pork of normal pH (5.4-5.8) has a storage life of about 6 wk. at 0 C. In contrast, high pH meat (pH > 6.0) often spoils after only three to 4 wk. due to the development of putrefactive off-odours and colour defects (greening). These are produced as a result of the increased growth of psychrotrophic Gram-negative bacteria which occurs when muscle pH is high. Storage in a very high conc. of carbon dioxide and pre-treatment of the meat with a dilute solution of acetic acid before vacuum-packing are techniques that inhibit the growth of spoilage organisms during storage. The potential of these procedures to extend the storage life of pork stored at 0-5 C is discussed.

Meat products

1047 Madril (MT) and Sofos (JN). Interaction of reduced NaCl, sodium acid pyrophosphate and pH on the antimicrobial activity of comminuted meat products. **Journal of Food Science** 51(5); 1986; 1147-1151

The experiment was conducted with meat (beef pork) batters, formulated with (NaCl) and sodium acid pyrophosphate (SAPP) in 3 different combinations and at 3 pH levels. The data clearly show that NaCl (4.1% brine) delays microbial growth at pH levels of 6.0 or lower. Reduction of NaCl to 2.3% brine can result in a very short shelf life even at the low pH of 5.7. SAPP improves the antimicrobial properties of reduced NaCl comminuted meat products. Its effects are due to both declining pH and presence of phosphates in the formulation. OES

Frankfurters

1048 John (LCSt), Buyck (MJ), Keeton (JT), Leu (R) and Smith (SB). Sensory and physical attributes of frankfurters with reduced fat and elevated monounsaturated fats. **Journal of Food Science** 51(5); 1986; 1144-1146, 1179

Instrumental and sensory evaluation were carried out on frankfurters made with an increased monounsaturated/saturated (M/S) lipid ratio and 25% less fat than the control. The M/S ratio was altered by using lean and fat trimmings from pigs fed canola oil (CO). Incorporation of 10% and 20% CO pork tissues into frankfurters increased the total unsaturated fatty acids by 11% and 18.6% resp. Texture profile analysis showed a slight increase in cohesiveness with increased CO, while decreasing the fat increased the gumminess and chewiness of the product. Sensory analyses indicated that the experimental frankfurters compared well with the control in overall palatability. OES

Poultry

1049 Okrend (AJ), Johnston (RW) and Moran (AB). Effect of acetic acid on the death rates at 52 C of **Salmonella newport**, **Salmonella typhimurium** and **Campylobacter jejuni** in poultry scald water. **Journal of Food Protection** 49(7); 1986; 500-503

1050 Singh (RP) and Panda (B). Frozen storage of poultry and poultry products (Review). **Indian Food Industry** 5(4); 1986; 172-176

Aspects covered include: prefreezing treatments; packaging, pre-cooking; freezing methods; frozen storage; thawing methods; cooking methods; convenience poultry products; egg products; liquid whole egg; egg yolk; egg white and future considerations. BV

Chickens

1051 Lawrence (RA) and Jelen (P). Retort stability of freeze-texturized, alkali-extracted chicken protein. **Journal of Food Science** 51(5); 1986; 1384-1385

Ducks

1052 Bonnefoi (M), Benard (G) and Labie (C). Gel electrophoresis: A qualitative method for detection of duck and goose liver in canned foie gras. **Journal of Food Science** 51(5); 1986; 1362-1363

Turkeys

1053 Barbut (S), Tanaka (N), Cassens (RG) and Maurer (AJ). Effects of sodium chloride reduction and polyphosphate addition on **Clostridium botulinum** toxin production in turkey frankfurters. **Journal of Food Science** 51(5); 1986; 1136-1138

The effects of reducing NaCl levels from 3.0% to 1% on toxin production in turkey frankfurters inoculated with **Clostridium botulinum** and the effects of three types of polyphosphates (Sodium tripolyphosphate, TPP, Sodium hexametaphosphate, HMP, and sodium acid pyrophosphate, SAPP) in combination with reduced salt conc. were reported. There was a gradual increase in toxin production as brine conc. decreased. By increasing the NaCl content from 1% to 3%, toxin production was delayed by 3 days on the av. Toxin production was detected earlier when TPP was added. Addition of HMP made no difference, while that of SAPP delayed toxin production by a day. DES

1054 Barbut (S), Tanaka (N) and Maurer (AJ). Effects of varying levels of chloride salts on **Clostridium botulinum** toxin production in turkey frankfurters. **Journal of Food Science** 51(5); 1986; 1129-1131

The inhibitory capability of NaCl, KCl and magnesium chloride was tested in a turkey frankfurter system inoculated with C. **botulinum.** Increasing the ionic strength (I.S.) of NaCl from 0.42 to 0.68 delayed the toxin production from 4 days to 40 days. KCl was almost as effective as NaCl at I.S. 0.42, but less effective at higher levels. magnesium chloride was least inhibitory. Replacing of half of the 2.5% NaCl with KCl or magnesium chloride generally reduced the time for toxin production. DES

1055 Cornforth (DP), Vahabzadeh (F), Carpenter (CE) and Bartholomew (DT). Role of reduced hemochromes in pink colour defect of cooked turkey rolls. **Journal of Food Science** 51(5); 1986; 1132-1135

Reflectance and absorbance spectrophotometric studies on commercial and laboratory samples showed that the pigments responsible for a pink colour defect sometimes observed in freshly cut surfaces of cooked turkey rolls were reduced hemochromes, possibly nicotinamide-denatured globin hemochromes, rather than nitrosyl pigments. Oxidation-reduction potential measurements of meat systems showed that hemochrome formation was promoted by reducing conditions and prevented by oxidizing conditions. All constituents necessary for the production of pink colour defect were present in turkey meat. The variable most affecting its appearance was the redox potential of the meat. AA

Poultry products

Eggs

1056 Deep Sharma Nanda (SK). Duck egg - equally good in human diet. **Poultry Guide** 24(2); 1987; 33-35

Nutritionally ducks eggs compare well with hens eggs. Duck eggs are larger than chicken's eggs and contain a slightly less water. They also have higher fat content; but the cholesterol content of a duck's egg (140 mg) is smaller than that of a hen's egg (180 mg). Further, duck's eggs have a better storage capacity, are less prone to breakage, and have less of sulphurous odour. The bad smell of duck's eggs is associated with the dirty and unhygienic places, where they are produced. KMD

1057 Itoh (T), Kubo (M) and Adachi (S). Isolation and characterization of major apoproteins from hen's egg yolk granule. **Journal of Food Science** 51(5); 1986; 1115-1117

Different patterns were obtained from granular and plasma fractions of egg yolk by SDS-polyacrylamide gel electrophoresis. Three major components of granular apoprotein which constitute 19.4, 14.5, and 43.4% of the protein moiety with estimated mol. wt. of 28,000, 74,000, and 109,000 daltons, resp., were isolated by preparative SDS-gel electrophoresis. They were found to be glycoproteins containing mannose, galactose, and hexosamine. Sialic acid was found only in the 74,000 and 109,000 dalton components. Phosphorus content of the 28,000, 74,000 and 109,000 dalton components were 2.0, 1.2, and 0.4%, resp. AA

1058 Watanabe (K), Hayakawa (S), Matsuda (T) and Nakamura (R). **Combined** effect of pH and sodium chloride on the heat-induced aggregation of whole egg proteins. **Journal of Food Science** 51(5); 1986; 1112-1114, 1161

Heat-induced aggregation of whole egg proteins through various treatment combinations ranging from 70-85 C, pH 2.0-9.0, and NaCl concn. of 0-3%, was investigated using multiple regression analysis and vertical flat-sheet polyacrylamide gel electrophoresis. The importance of single variable was in the order of temp. pH and NaCl concn. and the combined variable of pH and NaCl had a highly significant ($p < 0.001$) effect on soluble protein content. From the fractional and step-wise aggregation appearances of whole egg proteins in the electrophoretic patterns, the heat stability of main proteins was considered to increase as pH (pH > 5) and NaCl concn. increased. AA

Egg products

1059 Bergner-Lang (B). Enzymatic determination of D(-)-3-hydroxybutyric acid in egg products. **Deutsche Lebensmittel-Rundschau** 82(7); 1986; 226-227 (De).

Unfertilized and fertilized (or incubated) eggs can be differentiated by examination under light (candling), Unfertilized eggs appear clear under light and their white and yolk are sharply separated. Incubated eggs on the other hand show a "heat spot" or a distinct bubble. But in some incubated eggs, the embryo "dies" quickly and they still appear to be clear under candling; but the egg white and egg yolk in them are mixed up and not sharply differentiated. Such eggs which have not been incubated for more than 6 days, may be used for the preparation of "liquid egg", and would yield a product having a 3-hydroxybutyric acid content less than 10 mg/Kg dry wt. KMD

SEAFOODS

1060 Majumdar (DC). Standards of marine products for export. **Seafood Export Journal** 19(3); 1987; 9-11

It is a general article covering aspects like quality of Indian marine products; bacteriological standards introduced in India; and the bacteriological standards for the importing countries. KMD

Fish

Bombay duck

1061 Bhattacharya (S) and Bose (AN). Protein drink from fish protein isolate. **Journal of Food Science and Technology, India 23(6); 1986;** 319-321

Protein isolate without any off-flavour was prepared from the low cost marine fish, Bombay duck (**Harpodon nehereus**) by treatment with NaOH (N/10) solution at 95-100 C for 20 min followed by filtration, fat removal, ion-exchange and dehydration. The protein isolate contained 4% moisture and 82% protein. A sweet-sour drink was prepared by blending the protein isolate at 3% level with cane sugar and citric acid. Higher levels of addition of fish protein isolate resulted in sedimentation. The bottled drink could be preserved for 3 months after adding 70 p.p.m. of sulphur dioxide; the storage life was increased to 4-8 months when orange flavour was added. KAR

Pomfrets

1062 Krishnoji Rao (BY) and Bandyopadhyay (C). Changes in muscle lipid composition of white pomfret (**Stromateus cinereus**) during ice-temperature storage. **Journal of Food Science and Technology, India** 23(6); 1986; 334-336

White pomfret fillets were stored at 0-2 C for 10 days and analysed for changes in muscle lipid, glyceride, free fatty acid content and organoleptic score. The lipid content of fresh muscle ranged from 1.9 to 3.2% on wet wt. basis. Glycerides constituted about 93% of the total lipids and palmitic acid was the major fatty acid (31%) followed by oleic acid (20%). During storage for 10 days the lipid content increased from 1.9 to 2.0%, glyceride content (as % of total lipid) decreased from 93.0 to 71.0, free fatty acid increased from 15.5 to 20.5 µmol./g lipid. The samples stored for 5 days were acceptable whereas that stored for 10 days were organoleptically unacceptable due to softening, development of ammonical taste and acidic odour. No appreciable change in the fatty acid composition was observed during at 0-2 C storage of muscle except a decrease of 20-15% of oleic in 10 days period. KAR

Sauces

1063 Nakano (T), Watanabe (H), Hata (M), Qua (H) and Miura (T). An application of protease produced by a moderately halophilic marine bacterium to fish sauce processing. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 52(9); 1986; 1581-1587 (Ja).

Addition of **Pseudomonas** sp could hydrolyze fish bodies **Sardinops melanostica**, into fish sauce rapidly and the product contained amino acids, especially, glutamic acid, lysine, aspartic acid, serine, threonine, alanine and methionine at high concn. The **Pseudomonas** sp protease was able to shorten the fermentation time of fish sauce from 1 1/2 to 3 years to 3-6 months. KAR

Tunas

1064 Davie (PS) and Sparksman (RI). Burnt tuna: An ultrastructural study of postmortem changes in muscle of yellowfin tuna (**Thunnus albacares**) caught on rod and reel Southern bluefin tuna (**Thunnus maccoyii**) caught on handline or longline. **Journal of Food Science** 51(5); 1986; 1122-1128, 1168

1065 Watanabe (E), Fukuda (M), Hayashi (T) and Toyama (K). Influence of atmospheric oxygen and freshness on the oxidation of fish lipids during their extraction. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 52(8); 1986; 1473

It was observed that the lipids of bluefin tuna became liable to the oxidation by the atm. oxygen during the extraction as its freshness lowered. It was concluded that all the extraction processes of fish lipids should be carried out under an inert gas when fish were stored after the catch. KAR

Molluscs

1066 Kojima (K), Nakayama (Y), Hatanaka (M), Hata (M) and Hata (M). The distribution of sulpholipid in marine molluscs. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 52(9); 1986; 1601-1605

All marine molluscs examined contained low concn. (1-3% of total lipid) of sulpholipid; gonads and the digestive diverticula contained more sulpholipid than other tissues. Seasonal fluctuation in sulpholipid content was also seen. KAR

Mussels

1067 Ablett (RF), Gould (SP) and Sherwood (DA). Frozen storage performance of cooked cultivated mussels (**Mytilus edulis** L.). Influence of ascorbic acid and chelating agents. **Journal of Food Science** 51(5); 1986; 1118-1121

The usefulness of ascorbic acid and chelating agents in retarding sensory deterioration and progression of oxidative rancidity in frozen-cooked mussels was investigated. Ascorbic acid with and without chelating agents proved effective in arresting progression of oxidative rancidity, in samples held at - 12 C for 20 wk. However, these agents proved ineffective in preventing sensory deterioration of mussel meats under the same conditions. Mussels held at - 30 C showed an improved sensory stability throughout the study and demonstrated less progression of lipid oxidation compared with mussels held at - 12 C. Sensory deterioration at - 12 C storage is associated in part, with lipid oxidative changes. The ineffectiveness of antioxidant agents in preventing sensory deteriorative changes may indicate the presence of other, as yet undetermined, degradative pathways. AA

Squids

1068 Dhananjaya (S), Krishnakumar (S) and Hiremath (GG). Effect of handling on the pink discolouration in fresh squid during iced storage. **Seafood Export Journal** 19(3); 1987; 13-14

Fresh squids were ice-stored for 6 days as such or after removing head, viscera, internal shell and the skin and were tested for pink discolouration everyday. In commercial samples pink discolouration appeared on the second day. The skinned samples were completely devoid of discolouration on the sixth day also and it was concluded that the chromatophore pigment of the skin penetrated inside to give pink discolouration. KMD

PROTEIN FOODS

1069 Areas (JAG). Hydrophobic and electrostatic interactions on extrusion of protein isolates. Journal of Food Science 51(5); 1986; 1311-1313, 1322

1070 Malleshi (NG), Raghavendra Rao (SN), Sreedharamurthy (S) and Desikachar (HSR). Development of weaning foods based on some traditional technologies. **Journal of Food Science and Technology, India** 23(6); 1986; 315-318

Weaning food formulations were prepared from (a) chapati, (b) extruded food, (c) popped food and (d) flaked food. In (a), flours from wheat, maize, sorghum were blended with toasted green gram and popped Bengal gram flours in 70:20:10 ratio resp. to have 14% protein in the final blend. Chapatis prepared from the above blends were dried and powdered to pass through 30 mesh sieve which is used as the weaning food. In (b), hot water dough prepared from a blend of pearled sorghum, toasted green gram and popped Bengal gram flours (70:20:10) was extruded, steam cooked and dried and the dry powder of this was used. In (c) popped millet, toasted green gram and popped Bengal gram were mixed in 70:20:10 ratio and powdered as in (a) and used as weaning food. In (d) beaten rice flour and processed soybean flour were mixed in 70:30 ratio and used as weaning food. The cooked paste viscosity (cp units) of the blends ranged from 1700 to 6000 which was brought down to 42-108 by adding 5% barley malt. The protein content of the weaning foods ranged from 12.5 to 17.5% and the PER as determined by rat experiments was 2.60 to 2.71 for (a) 2.68 for (b), 2.69 for (c) and 2.82 for (d) and the skim milk powder was 3.19. Preliminary feeding studies with these weaning foods indicated that they were accepted by children; 70 g of weaning food would supply nearly 300 cal with about a quarter of the price of the commercially marketed weaning foods. KAR

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Wines

1071 Baucom (TL), Iabacchi (MH), Cottrell (THE) and Richmond (RS). Biogenic amine content of New York State wines. **Journal of Food Science** 51(5); 1986; 1376-1377

Biogenic amines in New York State wines were determined by HPLC. Histamine, putrascine and cadaverine were present in all samples. Fermentation temp. had little effect on amine formation. Amine levels varied from location to location. There were also differences due to variety and verification processes. OES

1072 McCallum (NK), Rothbaum (HP) and Otlet (RL). Detection of adulteration of wine with volatile compounds. **Food Technology in Australia** 38(8); 1986; 318-319, 325

Carbon dating of isoamyl alcohol isolated from wine has been used for confirming adulteration of a suspected sample by an essence. This methodology should prove to be a useful general approach to detecting whether food or wine has been adulterated with 'nature identical' synthetic compounds. AA

1073 Werkhoff (P) and Bretschneider (W). Detecting DEG in wine & juice. **Food Engineering International** 11(8); 1986; 37-39

Non-alcoholic beverages

Coffee

1074 Anon. Freeze drying: Popular method for solubles. **Tea and Coffee Trade Journal** 158(4); 1986; 27-28

Covers granulation; freeze-drying and packaging. BV

Coffee

1075 Graf (U) and Wurgler (FE). Investigation of coffee in **Drosophila** genotoxicity tests. **Food and Chemical Toxicology** 24(8); 1986; 835-842

Dominant lethal test, sex chromosome loss test, somatic mutation and recombination test and sex-linked recessive lethal assay were performed on instant coffee and freeze dried brewed coffee. While the first three tests showed no significant differences between the two coffees, the last one gave no conclusive evidence of an effect for either coffee. The weak effects obtained with the two coffees in the somatic mutation and recombination test, which has been shown as a very sensitive assay, were most probably produced by the caffeine contained in the coffees. Decaffeinated coffee was clearly inclusive in somatic cells, while pure caffeine showed a positive effect. MVG

1076 Hostmark (AT), Haug (A), Bjerkedal (T), Eilertsen (E), Spydevold (O) and Lystad (E). Coffee drinking reduces fecal sterol excretion in the rat. **Nutrition Reports International** 34(1); 1986; 119-127

1077 Udayasankar (K), Manohar (B) and Chokkalingam (A). A note on supercritical carbon dioxide decaffeination of coffee. **Journal of Food Science and Technology, India** 23(6); 1986; 326-328

Coffee beans were decaffeinated using supercritical carbon dioxide at 260 bar pressure and 50 C in 4 1 batch type high pressure extractor. The rate of removal of caffeine by supercritical carbon dioxide was found to be much higher than dichloromethane extraction. The apparent coeff. of diffusion of caffeine in coffee beans was 2.53 x 10^6 cm^2/sec. The green beans decaffeinated by supercritical carbon dioxide looked like normal beans with slightly puffed appearance. Supercritical carbon dioxide decaffeinated coffee showed a roasting loss of 16.3%, breaking strength of 15.2 p.s.i. and soluble solids content of 24.2%. Proximate composition of dichloromethane extracted and supercritical carbon dioxide extracted roasted and ground coffee is given. The processing energy costs calculated from pilot plant studies on 2-kg batch for supercritical carbon dioxide extraction and 10 kg batches for dichloromethane extraction were Rs. 1.40 and Rs. 4.60 resp. for producing 1 kg of decaffeinated coffee beans. KAR

Fruit juices

1078 Adhikary (SK), Harkare (WP), Govindan (KP), Chikkappaji (KC), Saroja (S) and Nanjundaswamy (AM). Deacidification of fruit juices by electrodialysis. Part II. **Indian Journal of Technology** 17(4); 1987; 33, 35, 37-38

Deacidification of pineapple, orange and grape juices using electrodialysis has been investigated. After lab. scale studies of all the three fruit juices, bench scale experiments were carried out using an electrodialysis unit of size 50 x 22 cm consisting of 45 cell pairs for orange and grape juices. The effect of electrodialysis on density, acidity, pH, ascorbic acid and organoleptic qualities was investigated. During electrodialysis (ED) in all the three juices the acidity and pH reduced, the flavour of grape juice was not affected but that of pineapple and orange juices reduced. pH reduction imparted tart taste to pineapple juice. ED decreased the ascorbic acid in pineapple and orange juices thiamine and carotenoid pigments of orange juices were also reduced. To improve the taste the juices were recirculated through the stack for 45 min, without applying the potential. This increased the pH to the original level and decreased the acidity further.The taste but not the flavour of grape juice was improved. The tart taste in pineapple juice disappeared; but the flavour of juice could not be restored in both pineapple and orange juices. The bitter taste of the orange juice also increased. There was further loss of ascorbic acid from both the juices. In model system when sugar syrup was dialysed with the presence of buffer salts the pH decreased from 3.5 to 2.4 during electrodialysis and then increased to 3.25 with recirculation. But without buffer salts the pH of the syrup increased marginally on electrodialysis. During electrodialysis, concn. of the ions of Na^+, K^+ and Ca^{2+} salts decreased as also pH, but on recirculation these ions diffused back to the juice. During 6 months storage of bottled and canned juice at 25 and 37 C there was no significant difference in properties between the controls and deacidified juices. The energy requirement for deacidification of orange and grape juices was in the range of 6-10 kWh/m^3 of the fruit juices in bench scale trials. KAR

Apple juices

1079 Azad (KC), Vyas (KK), Joshi (VK) and Sharma (RP). Observation on juice and cider made from scabbed apple fruit. **Indian Food Packer** 41(1); 1987; 47-54

The yield and quality of juice obtained from the scab infected (caused by **Venturia inaequalis**) apple fruit did not differ from those obtained from normal fruits except a higher phenolic content in the scab infected fruit juices. The juice from the scabbed fruit except for the highly infected fruit was like that of normal fruit and was free from patulin and aflatoxin. The fermentation behaviour of juice from scabbed fruit was almost similar to that of juice from normal fruit. The juice from scabbed fruit (except that of highly infected fruit) was acceptable organoleptically. The cider prepared from the infected fruit including that of highly infected fruits was acceptable by the panel of judges. KAR

1080 Wiesenberger (A), Kolb (E), Schildmann (JA) and Dechen (HM). The lactofermentation of natural sources with low pH-values. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(1/2); 1986; 32-36 (De).

Lactic acid fermentation of food and feed products is reported to in order to bring down the pH value of the product to be preserved to about 4.0. This is especially true in the use of vegetables. The authors have used special cultures of **Lactobacillus casei** to treat acidic fruit juices, and could increase the lactic acid content of the juice to 10g/l. The main purpose behind this attempt was not to pressure the fruit juice, but to improve its nutritional value by increasing the lactic acid content. The process has been called of "Lactofermentation". KMD

Citrus juices

1081 Johnson (RL) and Chandler (HV). Debittering and de-acidification of fruit juices. **Food Technology in Australia** 38(7); 1986; 294-296

It is possible to use commercially available adsorbent resins to adsorb bitter principles and titratable acids, or to adsorb both bitter principles and acid simultaneously from citrus juices choosing resins. Work is in progress to determine whether these adsorbents, when used under specific conditions, significantly alter the essential composition of citrus juices. From a cost model band on pilot plant data. It is estimated that reduction of both bitterness and acidity can be accomplished for less than one cent/l of treated juice. KAR

Grape juices

1082 Salgues (M), Cheynier (V), Gunata (Z) and Wylde (R). Oxidation of grape juice 2-S-glutathionyl caffeoyl tartaric acid by **Botrytis cinerea** laccase and characterization of a new substance: 2, 5-di-S-glutathionyl caffeoyl tartaric acid. **Journal of Food Science** 51(5); 1986; 1191-1194

Guava juices

1083 Kalra (SK), Tandon (DK) and Lohani (HC). Prevention of discolouration in guava beverage during storage. **Indian Food Packer** 41(1); 1987; 21-25

Guava beverage prepared from cv. Allahabad Safeda was stored at 20-36 $degree$C in glass bottles for 12 months after treating with 50 mg % vitamin C (T_2), 50 p.p.m. of sodium glutamate (T_3) and 50 p.p.m. of sorbic acid (T_4) and compared with control (T_1). They were assessed at 2, 7 and 12 months storage for soluble solids, acidity, vitamin C and organoleptic score. No defect was observed after 2 months storage in any treatments and after 7 months, T_4 was the best with only slight off-flavour while T_2 had residual taste and pink discolouration in addition to off-flavour, T_3 had slight discolouration. T_1 also developed slight off flavour. After 12 months except T_4 all treatments developed brownish tinge, off-flavour and off-taste. The slight discolouration and watery taste of T_4 does not prevent its marketability. The loss in vitamin C was 35-40% after a year's storage whereas the contents of soluble solids and acidity increased in all treatments. KAR

Orange juices

1084 Aries (RE), Gutteridge (CS) and Evans (R). Rapid characterization of orange juice by pyrolysis mass spectrometry. **Journal of Food Science** 51(5); 1986; 1183-1186

1085 Fellers (PJ), de Jager (G) and Poole (MJ). Quality of retail Florida-packed frozen concentrated orange juice as determined by consumers and physical and chemical analyses. **Journal of Food Science** 51(5); 1986; 1187-1190

Six commercial Florida-packed frozen concn. orange juice samples drawn from the U. S. retail market on a monthly basis for 1 yr were evaluated for sensory attributes, colour (by colorimeter), Brix, acid, and bottom pulp. Consumers rated flavour, "like moderately" on a 9-point hedonic scale for every sample. The degree of sweetness and tartness of samples was "just right"; bitterness was some what excessive and colour was somewhat too light ($P < 0.05$). Generally, as the Brix to % acid ratio increased, the flavour improved, and the closer to "just right" was the degree of sweetness, tartness, and bitterness. A significant amount of bitterness was perceived as tartness or lack of sweetness ($P < 0.01$). Plant-to-plant variation was found in ratings of flavour and colorimeter colour and Brix to % acid ratios. AA

FATS AND OILS

Fats

1086 Won Park (S) and Addis (PB). Further investigation of oxidized cholesterol derivatives in heated fats. **Journal of Food Science** 51(5);

1986; 1380-1381

The oxidation of cholesterol in tallow heated to various frying temp. was studied by capillary gas chromatography and the results were reported. OES

Cocoa butter

1087 Carlin (JT), Lee (KN), Hsieh (OAL), Hwang (LS), Ho (C -T) and Chang (SS). Comparison of acidic and basic volatile compounds of cocoa butters from roasted and unroasted cocoa beans. **Journal of the American Oil Chemists" Society** 63(8); 1986; 1031-1036

A total of nine acidic and 83 basic compounds was identified in the roasted and unroasted cocoa butter samples. Forty seven of the compounds identified are being reported for the first time in cocoa. The higher concn. of short chain fatty acids in the unroasted cocoa butter is responsible for its acidic aroma characteristics. The roasted cocoa butter generally contained greater numbers and higher concn. of compounds whose formations would be favoured by thermal processing. These compounds included pyrazines, thiazoles, oxazoles and pyridines. The aromas of many of these compounds are characteristic of the aroma differences between the two cocoa butters and contribute to the cocoa aroma of roasted cocoa butter. AA

Fatty acids

1088 Gibon (V), Durant (F) and Deroanne (C). Polymorphism and intersolubility of some palmitic, Stearic and oleic triglycerides. PPP, PSP and POP. **Journal of the American Oil Chemists" Society** 63(8); 1986; 1047-1055

Shortenings

1089 Smith (LM), Clifford (AJ), Hamblin (CL) and Creveling (RK). Changes in physical and chemical properties of shortenings used for commercial deep-fat frying. **Journal of the American Oil Chemists" Society** 63(8); 1986; 1017-1023

The composition of fresh and used shortenings from California restaurants and fast-food outlets was studied and the relationships among the physical and chemical data obtained were evaluated. MVG

Oils

1090 Karnofsky (G). Design of oilseed extractors I. Oil Extraction. **Journal of the American Oil Chemists" Society** 63(8); 1986; 1011-1014

A calculation method is presented that predicts, from laboratory data, retention time and miscella concn. in commercial oil extractors. The method is based on the finding that rate of solution of oil largely determines retention time, and that resistance to diffusion of oil at the boundaries of the flakes is relatively small. AA

1091 Karnofsky (G). Design of oilseed extractors. II. Multicomponent extraction. **Journal of the American Oil Chemists" Society** 63(8); 1986; 1015-1016

Extraction of carbohydrates from white flakes with aqueous ethanol is used to illustrate some generalizations about extraction of any multicomponent solute. Since commercial design must be based on a laboratory simulation a preferred simulation is presented. AA

1092 Murthi (TN), Devadhara (VD) and Chakraborty (CK). The quality of edible oils in the retail markets of the country. **Indian Food Industry** 5(4); 1986; 177-181

A survey on the quality of edible oil (coconut oil; groundnut oil, mustard oil and soybean oil) commonly consumed in the country is reported based on their physico-chemical tests and the GLC analysis of their fatty acid composition. BV

1093 Srinivasan (VT), Singh (BB), Chidambareswaran (PK) and Sundaram (V). The effect of hydrogen content on estimation of seed oil by pulsed nuclear magnetic resonance. **Journal of the American Oil Chemists" Society** 63(8); 1986; 1059-1062

Canola oils

1094 Hsu (N), Diosady (LL), Graydon (WF) and Rubin (LJ). Heterogeneous cataBytic hydrogenation of canola oil using palladium. **Journal of the American Oil Chemists" Society** 63(8); 1986; 1036-1042

Essential oils

Orange oils

1095 Owusu-Yaw (J), Matthews (RF) and West (PF). Alcohol deterpenation of orange oil. **Journal of Food Science** 51(5); 1986; 1180-1182

Sesquiterpeneless essential oils were prepared by extracting commercial cold-pressed Valencia orange oils with aqueous ethyl alcohol. Two levels of alcohol, 60 and 70, were used to extract the oils in three different oil-solvent ratios. Quantitative and qualitative composition of the individual components of the extracts was established by gas chromatography and mass spectrometry and confirmed using standard compounds. The ratio 1:3 oil:solvent resulted in sesquiterpeneless oils with the lowest terpene content. However, this ratio also gave the lowest oil recoveries. The highest oil recoveries were obtained with the ratio 1:15, but d-limonene was present in high concn. The process produced a terpeneless and sesquiterpeneless orange oil which should have unique flavour applications. AA

Palm oils

1096 Majumdar (S), Bhattacharyya (AC) and Bhattacharyya (DK). Nutritional evaluation of fractionated randomised palm oil and vanaspati. **Journal of Food Science and Technology, India** 23(6); 1986; 321-325

Palm oil was randomised using sodium methoxide catalyst (30% w/v in dry methanol) in N atm. at about 90 C for 30 min and fractionated in hexane at 15 C for about 1 h. Rats were fed diets containing 10% fractionated randomised palm oil (FRPO) and vanaspati (hydrogenated vegetable oil) separately and the coeff. of digestibility, organ wt., plasma lipids, major lipid component of the liver and heart and fatty acid composition of tissues were determined. The coeff. of digestibility for FRPO was 95.9% and for vanaspati 93.6%. Triglyceride and free cholesterol were lower for FRPO. The organ wt. were almost equal for the diets containing FRPO and vanaspati. Total lipid content of liver and heart was 299.5 ml/100 ml and 33.2 mg/g for FRPO and 286.7 mg/100 ml and 39.8 mg/g for vanaspati, FRPO was found to be a better dietary fat than vanaspati. KAR

Sesame oils

1097 Fukuda (Y), Nagata (M), Osawa (T) and Namiki (M). Contribution of lignan analogues to antioxidative activity of refined unroasted sesame seed oil. **Journal of the American Oil Chemists" Society** 63(8); 1986; 1027-1031

A lignan compound, P3, having strong antioxidative activity was found to be formed in high concn. during the industrial bleaching process of unroasted sesame seed oil. P3 (named sesaminol) was identical to a minor constituent previously isolated from acetone extract of sesame seed. It was shown that sesamolin in unprocessed sesame oil is the source of sesaminol, and the formation of sesaminol was confirmed by the model experiment with corn oil to which sesamolin had been added. Sesaminol was not so greatly removed by the deodorization process that follows bleaching as was seasmol, and it was shown to be at a concn. of ca. 100 mg/100g in commercial refined unroasted seed oil. The antioxidative activity of sesaminol was roughly equal to those of sesamol and $Gamma$-tocopherol by the thiocyanate method. Therefore, it seems that the antioxidative activity of refined unroasted seed oil is mainly attributed to sesaminol. AA

Soybean oils

1098 Snyder (JM), Frankel (EN) and Warner (K). Headspace volatile analysis to evaluate oxidative and thermal stability of soybean oil. Effect of hydrogenation and additives. **Journal of the American Oil Chemists" Society** 63(8); 1986; 1055-1058

Sunflower oils

1099 Purdy (RH). High oleic sunflower. Physical and chemical characteristics. **Journal of the American Oil Chemists" Society** 63(8); 1986; 1062-1066

SPICES AND CONDIMENTS

Spices

1100 Pesek (CA) and Wilson (LA). Spice quality: Effect of cryogenic and ambient grinding on colour. **Journal of Food Science** 51(5); 1986; 1386, 1388

A comparative study was carried out to find the effect of cryogenic and ambient grinding on the colour of spices. Cryogenic milled spices were lighter in colour than the ambient milled spices. Sensory analyses revealed that consumers preferred the familiar, darker colour of the ambient milled spices. OES

Ginger

1101 Chen (C-C), Kuo (MC) and Ho (C-T). High performance liquid chromatographic determination of pungent gingerol compounds of ginger (Zingiber officinale Roscoe). **Journal of Food Science** 51(5); 1986; 1364-1365

For processing of ginger products, evaluating the pungency is an important step toward the final quality. This paper reports the determinations of pungent gingerol compounds in green and dry ginger by reverse phase HPLC. OES

Paprika

1102 Zilberboim (R), Kopelman (IJ) and Talmon (Y). Microencapsulation by a dehydratihg liquid: Retention of paprika oleoresin and aromatic esters. **Journal of Food Science** 51(5); 1986; 1301-1306

This study investigates several parameters that affect the quality of microcapsules produced by the cold dehydration process. Ethanol is used as the dehydration agent, various simple volatile esters and paprika oleoresin are the core materials, and the gum arabic, the wall material. OES

Pepper

1103 Heath (H). Essential notes. **Food** 8(10); 1986; 55, 57, 59, 61

Review covers current techniques used in the extraction of flavouring materials; solvents used; solvent action; commercial products; extraction with carbon dioxide; composition of oleoresins and specific spice oleoresins. BV

SENSORY EVALUATION

1104 King (BM). Odour intensity measured by an audio method. **Journal of Food Science** 51(5); 1986; 1340-1344

A non-verbal, non-numerical method for measuring odour or taste intensity by means of cross-model matching by pitch using a devise called "intensometer" is described. OES

1105 Walchak (CG). Use of the computer in the sensory evaluation laboratory. **Food Technology in Australia** 38(4); 1986; 152-154

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Infestation control

1106 John Pereira, Rangaswamy (JR), Sashikala (VB). Biological potency of synthetic fatty esters as insect scents to **Tribolium castaneum** (Herbst) and **Trogoderma granarium** (Everts) **Indian Journal of Experimental Biology** 25(1); 1987; 44-47

Ethyl esters of oleic, palmitic, stearic, and linoleic acids, and methyl esters of oleic acid were prepared in their pure forms, and assayed as assembling scent to **T. granarium** and as repellent to **T. castaneum**. Methyl oleate at 1.5 and 2.1 μ/cm^2, ethyl oleate and ethyl stearate at 1.05 $\mu g/cm^2$ showed the highest repellency to **Tribolium castaneum.** Methyl oleate had a good assembling activity for **Trogoderma** females, and ethyl linoleate for males. Methyl ester of myristic acid was a better assembling scent to male **Trogoderma** beetles than any compound secreted by **Trogoderma**. KMD

Beetles

1107 Krishnamurthy (TS), Spratt (EC) and Bell (CH). The toxicity of carbon dioxide to adult beetles in low oxygen atmospheres. **Journal of Stored Products Research** 22(3); 1986; 145-151

Adults of **Sitophilus granarius, Tribolium castaneum, Oryzaephilus surinamensis, Cryptolestes ferrugineus** and **Rhyzopertha dominica** were exposed to simulated combusted atm. containing low oxygen [0.5-2.6%] and increased carbon dioxide [10-30%] with a balance of nitrogen at 20 C and 70% rh. The mixtures containing 1-1.6% oxygen killed all the insects within 7 days if they also contained 10% or more. At 2.0-2.6% Oxygen **C. ferrugineus** was more tolerant of carbon dioxide than the other insects tested, whereas at 0.5% oxygen **S. granarius** was the most tolerant species, needing 8-10 days for complete kill. AA

Callosobruchus

1108 Huguet (JS) and Xin (WG). Assessment of activity of deltamethrin against **Callosobruchus chinensis** L and **Callosobruchus maculatus** Fab. (Bruchidae). **International Pest Control** 28(2); 1986; 36-41
Deltamethrin at 0.25, 0.5 and 1 p.p.m is effective against **Callosobruchus chinensis** for more than 228 days and for more than six months under natural conditions at 0.75 p.p.m against **C. maculatus.** Deltamethrin destroys 91% of the eggs. A min. of 5 days is required between insects and the stored products to obtain 100% mortality at 0.25, 0.5 and 1 p.p.m. BV

Corcyra cephalonica

1109 Allotey (J). Competition between the two moths **Corcyra cephalonica** (Stainot.) and **Ephestia cautella** (Wlk.) on a laboratory diet. **Journal of Stored Products Research** 22(3); 1986; 103-107
Competition between **Corcyra cephalonica** (Staint.) and **Ephestia cautella** (Wlk.) was studied in a limited amount of standard medium (maize meal-wheat bran-glycerol) [8:8:1] (w/w) when the 2 species were reared separately (conditions CC and EC), when one was added before the other (conditions C + E/2 and E + C/2) and when both were introduced together (condition CC/EC). Separately, both **C. cephalonica** and **C. cautella** thrived well in limited and abundant supplies of food. **C. cephalonica** appeared the better competitor over 2 generations under conditions C + E/2 and CC/EC, when food was limited, and held on satisfactorily under condition E + C/2. In an abundance of food and space **C. cephalonica** again emerged as the better competitor, becoming dominant by the 3rd generation in conditions C + E/2, E + C/2 and CC/EC. AA

Ephestia cautella

1110 Shaaya (E) and Pisarev (V). The lethal effects of three insect juvenile hormone analogues on the developmental stages of **Ephestia cautella** (Wlk). (Lepidoptera: Phycitidae). **Journal of Stored Products Research** 22(3); 1986; 125-129
Methoprene inhibited metamorphesis and produced supernumerary giant larvae when it was given to larvae 5 days prior to pupation or youngers. However when given 1-3 days before pupation, it did not prevent pupation but did prevent adult emergence. Young pupae within a day were also found to be very sensitive to this compound. KAR

Pesticides

Insecticides

BHC

1111 Junqueira (VBC), Simizu (K), Videla (LA) and De Barros (SBM). Dose-dependent study of the effects of acute lindane administration on rat liver superoxide anion production, antioxidant enzyme activities and lipid peroxidation. **Toxicology** 41(2); 1986; 193-204

BIOCHEMISTRY AND NUTRITION

1112 Botticher (B) and Botticher (D). Simple rapid determination of thiamin by a HPLC methodology in foods, body fluids, urine and faeces. **International Journal for Vitamin and Nutrition Research** 56(2); 1986; 155-159

A direct assay for the detn. of thiamin in food, faeces, whole blood, serum and urine samples is described. After enzymatic digestion of the thiamin derivates to free thiamin, the whole thiamin content of the sample is detected by converting the thiamin to fluorescent thiochrome. After the extraction of thiochrome with butanol-2, separation by an automated HPLC technique is performed. Reference values in serum, blood, urine, faeces and for food samples are reported. AA

Biochemistry

1113 Tsutsui (T), Li-chan (E) and Nakai (S). A simple fluorometric method for fat-binding capacity as an index of hydrophobicity of proteins. **Journal of Food Science** 51(5); 1986; 1268-1272

Vitamins

1114 Gregory (JFIII), Ink (SL) and Sartain (DB). Degradation and binding to food proteins of vitamin B-6 compounds during thermal processing. **Journal of Food Science** 51(5); 1986; 1345-1351

Thermal degradation and interconversion of B-6 vitamins and the extent of their covalent binding to food protein during thermal processing at 121 C were studied. Analysis of radio-isotopically labelled forms of vitamin B-6 in thermally processed caseinate model systems, evaporated milk and chicken tissues indicated a marked variation in the net retention of the vitamin and in the extent of irreversible binding to protein. Extensive interconversion of B-6 vitamins was observed during all thermal treatments. OES

Nutrition

1115 Fomon (SJ), Ziegler (EE), Nelson (SE) and Edwards (BR). Requirement for sulphur-containing amino acids in infancy. **Journal of Nutrition** 116(8); 1986; 1405-1422

A series of studies designed to define the requirement of normal infants for the S containing amino acids was conducted with infant formulae prepared from isolated soy proteins. The formulae were fed with and without methionine suppl. Adequacy of the diet was judged by food intake, growth, serum chemical indices and N balance. Based on these observations, it was concluded that the requirement of male infants older than 56 days for S containing amino acids was 588 μ mol./100 kcal when the intake of methionine was 264 u mol./100 kcal and that of female infants, regardless of age, 533 μ mol./kcal when the intake of methionine was 239 μ mol./100 kcal. However, such intakes seemed inadequate to meet the requirement of male infants less than 56 days old. OES

1116 Mongeau (R) and Brassard (R). A rapid method for the determination of soluble and insoluble dietary fiber: Comparison with AOAC total dietary fiber procedure and Englyst's method. **Journal of Food Science** 51(5); 1986; 1333-1336

Total dietary fiber (TDF) was measured in 16 foods by three methods: a rapid enzyme-NDF (neutral detergent fiber) procedure supplemented with a separate procedure for soluble (SOL) fiber, the AOAC TDF method and the comprehensive Englyst's procedure. The NDF + SOL method needed less operator time than the AOAC method and its TDF values were in agreement with the AOAC method ($y = 0,98\ x - 0.39$; $r = 0.997$) and with the Englyst's method ($y = 1.17\ x - 0.19$; $r = 0.996$). The constituent sugars of polysaccharides in NDF + SOL residues were similar to those by the Englyst's method, indicating an adequate estimation of dietary fiber in foods and food products. AA

1117 Palmer (N). Further recommendations for dietary intakes for use in Australia. **Journal of Food and Nutrition** 42(2); 1986; 47-48

Four complete review articles on Mg, Vitamin A, Fe and Ca have appeared in support of the modified dietary recommendations of these nutrients for use in Australia. These modifications are made taking into account Australian conditions and food supply, as well as the newer knowledge about bioavailability and absorption of the nutrients and dietary requirements in differeing physiological conditions. OES

1118 Vijayender Rao (D). Importance of human milk in infant feeding. **Indian Dairyman** 37(11); 1985; 525-529

Latest understanding about the composition of human milk with emphasis on merits of breast feeding over cow milk has been discussed. The composition of human milk is best suited to normal healthy for the following reasons: The concn. of protein and minerals are balanced to fullfil the requirement of babies; the presence of specific whey proteins ideal for babys defence against infection. It is stressed that human milk is virtually impossible to mimic completely because of its specific proteins and its shifting composition which changes during lactation to meet the changing requirement of infants. However the milk produced by mothers giving birth to preterm infants is likely to be more different in which case artificial milk may assume importance. The efforts to improve the quality of artificial milks on the basis of the advancess in our knowledge of the properties and composition of human milk, are also discussed. MVG

TOXICOLOGY

Bacteria

Clostridium

1119 Harmon (SM) and Kautter (DA). Evaluation of a reversed passive latex agglutination test kit for **Clostridium perfringens** enterotoxin. **Journal of Food Protection** 49(7); 1986; 523-525

Staphylococcus

1120 Bennett (RW), Yeterian (M), Smith (W), Coles (CM), Sassaman (M) and McClure (FD). **Staphylococcus aureus** identification characteristics and enterotoxigenicity. **Journal of Food Science** 51(5); 1986; 1337-1339

Enterotoxigenicity and conventional test for identification of **Staphylococcus aureus** were correlated for strains of staphylococci isolated from foods. These strains were tested for enterotoxin production, colonial morphology, coagulase activity, thermostable nuclease production, lysostaphen sensitivity and anaerobic utilization of glucose and mannitol. OES

Mycotoxins

1121 Lenz (P), Sussmuth (R) and Seibel (E). Development of sensitive bacterial tests, exemplified by two mycotoxins. **Toxicology** 40(2); 1986; 199-205

For a sensitive bacterial test for mycotoxins the cup plate assay, based on growth inhibition, was optimised with **Bacillus thuringiensis** as test strain. **B. thuringiensis** allowed the detection of 1.25 µg kojic acid. A minimal amount of 12.5 µg kojic acid or 1.25 µg patulin was detectable by means of pigment suppression with isolated mutants of **Serratia marcescens**, whereas the wild type of this strain was insensitive. AA

1122 Snyder (AP). Qualitative, quantitative and technological aspects of the trichothecene mycotoxins (Review). **Journal of Food Protection** 49(7); 1986; 544-569

Aflatoxins

1123 Farag (RS), El-Leithy (MA), Basyony (AE) and Daw (ZY). Effects of varied substrates on aflatoxin production by **A. parasiticus**. **Journal of the American Oil Chemists" Society** 63(8); 1986; 1024-1026

Sterilized and nonsterilized wheat kernels, soybean seeds, sesame seeds, peanut and faba bean were infected by **A. parasiticus**. The chemical composition, aflatoxin content and fatty acids patterns of the seeds were determined. The aflatoxins B1, B2, G1 and G2 were detected, and the amounts of the unsaturated toxins (B1 and G1) were greater than the respective dihydroderivatives (B2 and G2). Sterilized seeds infected by the fungus contained greater amounts of aflatoxins than those infected without previous sterilization. The highest and lowest toxicity indices were recorded for sterilized wheat and soybeans, respectively. Sesame, peanut and soybean exhibited intermediate toxicity indices. The toxicity of the aflatoxins produced was related significantly in every instance to the carbohydrate and lipid:protein ratio, and not to the polyunsaturated fatty acids of the seeds. AA

FOOD LAWS AND REGULATIONS

Nil

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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm,cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal,kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg,ml,mm)
m-equiv	milli-equivalent
m	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-(10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc. normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-(as in µg, µm)
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

GENERAL

1124 Torev (A). Bioconversion of vegetable, animal, and industrial wastes by means of fungi mycelia in an artificial rumen. **Food and Nutrition Bulletin** 8(1); 1986; 81-85

Conversion of waste products from agriculture, animal husbandry, and the food industry into protein-enriched feeds by means of the artificial rumen method and fungi mycelia is discussed. BV

FOOD PROCESSING

Nil

FOOD PACKAGING

Packaging materials

Vinylidene chloride

1125 Demertzis (PG) and Kontominas (MG). Interaction between vinylidene chloride and copolymers of vinylidene chloride by inverse gas chromatography. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 249-252

FOOD ENGINEERING AND EQUIPMENT

1126 Aguerre (RJ), Suarez (C) and Viollaz (PE). Enthalpy-entropy compensation in sorption phenomena. Application to the prediction of the effect of temperature on food isotherms. **Journal of Food Science** 51(6); 1986; 1547-1549

1127 Biquet (B) and Guilbert (S). Relative diffusivities of water in model intermediate moisture foods. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 208-214 (Fr).

1128 Chen (CS). Effective molecular weight of aqueous solutions and liquid foods calculated from the freezing point depression. **Journal of Food Science** 51(6); 1986; 1537-1539, 1553

Freezing point depression (FPD) methods were applied to estimate the effective mol. wt. of pure solutions and liquid foods. They were considered to be accurate for non-acidic foods, but were found to under estimate the acidic foods. OES

1129 Dusold (LR) and Roach (JAG). Computer assistance in food analysis. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 754-756

Laboratory computer links are a key part of acquisition, movement, and interpretation of certain types of data. Remote information retrieval from databases such as the Chemical Information System provides the analyst with structural and toxicological information via a laboratory terminal. Remote processing of laboratory data by large computers permits the application of pattern recognition techniques to the solution of complex multivariate problems such as the detection of food adulteration. AS

1130 Elvira (Cde), Diaz (M) and Lombrana (I). Random pore model for freeze-drying simulation of frozen solutions with thermal control. **Revista de Agroquimica y Tecnologia de Alimentos** 26(1); 1986; 148-156 (Es).

A random pore model for simulating the freeze-drying operation on frozen solutions under thermal control is presented. Heat transfer equations are solved with unidirectional flow conditions, using a finite-difference type scheme. The temp. profile evolution obtained is more similar than that of other plane front models to experimental results. Freeze-drying times depend on initial mass distribution. AS

1131 Lefebvre (MS). Membrane technology and the food industry. **ASEAN Food Journal** 2(2); 1986; 51-57

The applicability and the relevance of the various membrane techniques which could be of interest to food industry were described in detail in this review article. OES

1132 Mollhoff (H). Automation in the flour milling industry. **Lebensmittelindustrie** 33(4); 1986; 171-172 (De).

1133 Reinhold (M), Sinkwitz (H) and Horn (M). Exact dosage of difficulty flowable bulk goods. **Lebensmittelindustrie** 33(4); 1986; 155-158 (De).

The tendency of cohesive bulk goods for bridging, or "shooting", causes the known dosage devices to fail in their work. To make them work, it is necessary to make the disturbances so regularly that their mean value, tends to zero, as a function of time. This is achieved by a special dosage device having a multiplicity of discharge openings, that take off the bulk material regularly from the total cross-section of the bunker outlet; the latter is dimensioned by the method of Jenike. The device has been tested industrially and can measure out cohesive bulk materials with sufficient exactness. KMD

Equipment

1134 Ajayi (OA). Development and testing of a hammer mill with a closed circuit system of grinding. **Journal of Food Science and Technology, India** 24(1); 1987; 1-5

A closed circuit hammer mill with the elimination of the screen from the grinding zone and replaced by breaker bars fitted to the wall of the grinding chamber has been proposed. Instead of the existing conveying fan, hammer was used as conveying fan; a conical screen was introduced into a cyclone with an external separator. Trials were conducted with American No. 2 maize grains with 8 and 4 hammer and 1-6 mm and 2.4 mm screens and the power consumption was compared with that of existing conventional hammer mill. The geometrical mean particle size with 1.6 mm screen was 265 to 295 µ and with 2.4 mm it was 340 to 548 µ . The throughput of the mill was higher for the 8 than for the 4 hammer operations with a higher production of fines. Energy saving was more with 4 hammers than with 8 hammers when 1.6 mm screen was used. Hammer tip speed affects the energy demand of the mill, irrespective of the number of hammers or the size of conical screen. The energy saving from grinding one tonne of material is 19.94% over that of existing mill. The mean particle size of the products increases with an increase in moisture content (tested 8-20% moisture) at all hammer tip speeds tested (40-70 m/s). Production of fine particles was more at lower (9-12%) moisture contents. KAR

Conveyors

1135 Honicke (G). Fully automatic roller conveyor applied in the VEB "Spreewaldkonserve" golsen. **Lebensmittelindustrie** 33(4); 1986; 164-165 (De).

The author explains the function of a fully automatic roller conveyor for the transportation of final products which are piled on wooden flat pallets. Moreover he deals with the effectiveness and profitability of the rationalization measure. AS

ENERGY IN FOOD PROCESSING

1136 Jastrebov (P), Bozenov (G Zuravlev (G), Koftenko (A). Influence of the yield of flour on energy consumption. **Lebensmittelindustrie** 33(4); 1986; 173 (De).

FOOD CHEMISTRY AND ANALYSIS

1137 Meena (BA),. Padma Umapathy (K), Pankaja (N) and Jamuna Prakash. Soluble and insoluble oxalates in selected foods. **Journal of Food Science and Technology, India** 24(1); 1987; 43-44

Oxalates which are known to influence the Ca absorption in foods were determined as total, soluble and insoluble oxalates; the contents of soluble oxalate in amaranth (**Amaranthus gangeticus**), kilkeerai (**Amaranthus tricolor**), drum-stick leaves (**Moringa oleifera**), horse gram (**Dolichos biflorus**) sesame (**Sesamum indicum**), cashewnut (**Anacardium occidentale**) and almond (**Prunus amygdalus**) were 52, 37, 28, 40, 19, 27 and 18% of the total oxalate, and Ca: oxalate ratio was 0.6, 0.6, 3.6, 1.2, 0.9, 0.,2 and 0.7 resp. Soluble oxalates were high in amaranth (313 mg/100 g), kilkeerai (274 mg/100 g) and sesame (289 mg/100 g). KAR

Chemistry (Analytical)

1138 Alvarez de Eulate (MJ), Montoro (R), Ybanez (N) and Guardia (ML). Determination of cadmium, copper, and lead in sodium chloride food salts by flame atomic absorption spectroscopy. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 871-873

A method for determination of Cd, Cu, and Pb in sodium chloride food salt samples has been developed. It consists of extraction in 4-methyl-2-pentanone of the complexes formed with ammonium pyrrolidine dichiocarbamate and further analysis of the extracts by flame atomic absorption spectroscopy. Detection limits in ng/g salt were 0.2 for Cd, 0.7 for Cu, and 10.0 for Pb. The coeff. of variation of 12 independent analyses were 13% for cd (at a level of 0.4 ppb), 18% for Cu (1.6 ppb), and 5% for Pb (40 ppb). The recoveries were 100 ± 0% for Cd, 115 ± 14% for Cu, and 100 ± 13% for Pb. AS

1139 DeVries (JW), Ge (H), Ebert (FJ), Magnuson (JM) and Ogawa (MK). Analysis for total sulphite in foods by using rapid distillation followed by redox titration. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 827-830

The method contains a selective distillation clean up procedure with the selective redox titration of sulphite ion by iodine. This method has been applied to variety of foods with no influence in any matrixes except garlic and leaks. The method typically shows a detection limit of 10 ppm, a relative standard deviation of 7.5% and recoveries of 97.9 ± 6.4%. The method has been compared with the

Monier-Williams method and found more acceptable. MVG

1140 Farre (R), Lagard (MJ) and Montoro (R). Atomic absorption spectrophotometric determination of chromium in foods. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 876-879

A method is reported for detn. of chromium in foodstuffs. Organic matter is digested with nitric acid, followed by oxidation to Cr(VI) and extraction with methyl isobutyl ketone (MIBK) after HCl addition. Chromium detn. are performed by flame absorption spectroscopy. Absence of interferences is verified and recovery tests are performed on food samples. Quantitation limit (3.8 ng/mL), accuracy (NBS Standard Reference Material 1573 Tomato leaves, 4500 plus or minus 500 ng/g, found 3860 ± 40.9 ng/g), and precision (CV for vegetable matrix = 9.05%, CV for animal matrix = 14.95%) of the procedure are evaluated. AS

1141 Lam (KC) and Deinzer (ML). Tentative identification of humulene diepoxides by capillary gas chromatography-chemical ionization mass spectrometry. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 57-59

Five isomers of humulene diepoxide, designated as A-E, were identified by capillary gas chromatography/mass spectrometry (Cap-GCCCC/MS) operated in uhe pulsed positive ion-negative ion chemical ionization (PPINICI) mode. These isomers had a mol. wt. of 236 and a mol. formula of $C_{15}H_{24}O_2$. An herbal/spicy flavour was detected from the mixture of these isomers. These diepoxides were found in selected hop essential oils and in both pilot-scale and commercial beers. AS

1142 Nagy (S) and Klim (M). Gas chromatography-mass spectral techniques in citrus essence research. **Food Technology** 40(11); 1986; 95-98

Mass spectrometer detectors complement gas chromatographs, leading to more accurate identification of volatile flavour components.. Article covers GC-MS technique, choice of columns, the GC-MS interface, noise and sensitivity and data processing methods. KAR

1143 Thompson (JN). Problems of Official Methods and new techniques for analysis of foods and feeds for vitamin A. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 727-738

Recent improvements in methodology particularly of LC are reviewed. Factors that affect quantification, such as sampling, preparation of standards and protection of the vitamin against oxidation are considered in the development of new methods. MVG

FOOD MICROBIOLOGY AND HYGIENE

Bacteria

Clostridium

1144 Hoskins (CB), Rico-Munoz (E) and Davidson (PM). Aerobic incubation of **Clostridium perfringens** in the presence of an oxygen-reducing membrane fraction. **Journal of Food Science** 51(6); 1986; 1585-1586

Salmonella

1145 Flowers (RS), Eckner (K), Gabis (DA), Robison (BJ), Mattingly (JA) and Silliker (JH). Enzyme immunoassay for detection of **Salmonella** in foods Collaborative study. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 786-798

A collaborative study was performed in 25 laboratories to validate an enzyme immunoassay (EIA) procedure utilizing 2 specific monoclonal antibodies for rapid detection of **Salmonella** in foods. The EIA was compared with the standard culture procedure for detection of **Salmonella** in 6 food types; ground black pepper, soy isolate, dried whole eggs, milk chocolate, nonfat dry milk, and raw deboned turkey. Uninoculated and inoculated samples were included in eachfood group analysed, with the exception of poultry which was naturally contaminated. There was no significant difference in the productivity of the EIA and culture procedures at the 5% level for any of the 6 foods. The enzyme immunoassay screening method has been adopted official first action. AS

Enzymes

1146 Lioutas (TS), Baianu (IC) and Steinberg (MP). Sorption equilibrium and hydration studies on lysozyme. Water activity and 360-MHz proton NMR measurements. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 133-137

An attempt to determine lysozyme hydration by employing a proton nuclear magnetic resonance (NMR) spin-echo technique (which is applicable over the whole range of concn.) and to correlate such measurements with the 20 C sorption equilibrium data is made. Detn. of specific site hydration for lysozyme, as well as proton NMR transverse relaxation rates for five different types of water populations in the lysozyme-water system, are presented over the whole range of lysozyme concn. The proton spin-echo NMR results are consistent with a three-component analysis of the sorption isotherm up to 70% water content, above which two additional water populations are identified by 360-MHz proton NMR spin-echoes. On the basis of the proton NMR results, a major component (III) of the lysozyme sorption isotherm is assigned to the water trapped between lysozyme mol. whose relaxation rate is increased by diffusion barriers. The trapped water population dominates the relationship between the relative vapour pressure (water activity) of hydrated lysozyme and the corresponding transverse proton NMR relaxation rates. AS

Phenolases

1147 Sayavedra-Soto (LA) and Montgomery (MW). Inhibition of polyphenoloxidase by sulphite. **Journal of Food Science** 51(6); 1986; 1531-1536

Exposure of polyphenoloxidase (PPO) to sulphite prior to the addition of substrate resulted in the irreversible inhibition of the enzyme. Attempts to regenerate the enzyme activity were unsuccessful. Increased concn. of sulphite and pH levels lower than 5 increased the inhibition. At pH 4, inhibition was complete and immediate with sulphite concn. of 0.04 mg/ml. Polyacrilamide gel studies demonstrated that the major mode of the direct irreversible inhibition of PPO was by modification of the protein structure with retention of its molecular unity. OES

Fungi

Aspergillus

1148 Dharmsthiti (SC), Flegel (TW) and Bhumiratana (A). Isolation and characteriztion of amylases from **Aspergillus flavus** var. Columnaris. A soy sauce koji mould. **ASEAN Food Journal** 2(2); 1986; 59-63

Aspergillus flavus var. Columnares ATCC 44310, a soy sauce koji mould was found to produce two different types of glucoamylases (GI and GII) and an Alpha-amylase (AI). The partially purified GI, GII and AI had a pH optima of 4.0, 5.0 and 5.0 and temp. optima of 50 C, 55 C and 55 C respectively. Isolation, purification and characterization of these enzymes were described. OES

Mushrooms

1149 Paakkonen (K) and Kurkela (R). Temperature effect on the water sorption of Northern milk cap mushrooms (**Lactarius trivialis**) in processing and storage. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 215-217

Yeasts

1150 Geiges (O) and Deriaz (J). Influence of storage temperature and relative humidity on the shelf-life of active dry yeasts. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(1/2); 1986; 25-31 (De).

Five different products of active dry yeast were stored during a 12-month period at different temp. and relative humidities. Viable counts were determined in regular intervals during the storage period. The ability of going into suspension of the different products, their sorption isotherms and the structure of the dry yeast granules are brought into relation to the storage behaviour. AS

Single cell proteins

1151 Guerra (NB), Stamford (TMM), de Medeiros (RB), de Freitas CP), Maia (SR) and Cavalcante (ML). Protein enrichment of pineapple waste for animal feeds. **Food and Nutrition Bulletin** 8(1); 1986; 77-80

Investigates the conversion efficiency of pineapple-waste carbohydrates into single cell proteins using submerged liquid fermentation method and **Aspergillus niger** for enrichment of pineapple waste. Pineapple waste gave highest protein content at 72 h of incubation when treated without the addition of KCl and ferrous sulphate to the medium. BV

BIOTECHNOLOGY

1152 Fleet (GH). Biotechnology and the food industry. **Food Technology in Australia** 38(11); 1986; 464-471

The review covers an exhaustive list of areas of biotechnology relevant to the food industry, specific applications of biotechnology in the food industry, and in food processing, production of food ingredients, utilization of food processing wastes, rapid methods for assessing product quality, legislation and food substances produced by biotechnology and future directions. KAR

1153 Lequèrica (JL) and Toldra (F). Microscopy examination of microorganisms in methanogenic fluidized bed reactors. **Revista de Agroquimica y Tecnologia de Alimentos** 26(1); 1986; 90-100 (Es).

Examination was performed on attached biofilm on inert support of acetate biomethanation fluidized bed reactors. By using light and scanning electron microscopy, microbial population was determined. Several methanogenic bacteria were identifed. Of these, **Methanosarcina** spp. were most prevalent in the biofilm. **Methanotrix** spp. were not detected through the time that experiments were carried out, however, one possible **Methanotrix** spp. was detected later. AS

TISSUE CULTURE

Nil

FOOD ADDITIVES

Acidulants

1154 Sharrock (JH). Food acidulants. **IFST Proceedings** 19(3); 1986; 101-106

Different food acidulants including citric acid, phosphoric acid, malic acid, lactic acid, tartaric acid, acetic acid, fumaric acid, their applications and production along with the market for these have been covered. KAR

Colorants

Turmeric

1155 Bhavanishankar (TN) and Sreenivasa Murthy (V). Reproductive response of rats fed turmeric (**Curcuma longa** L.) and its alcoholic extract. **Journal of Food Science and Technology, India** 24(1); 1987; 45-49

Reproductive response of rats fed turmeric (500 mg/kg body wt.) and its alcoholic extract (60 mg/kg body wt.) was examined for three generations. In general, no significant difference was noticed in the fertility index, gestation index, average number of pups born alive, viability index and lactation index between experimental animals and controls. Average wt of pups at birth on 12th and 21st days did not show marked deviation from that of respective control values. The data suggest that turmeric or its alcoholic extract is safe at the above levels with respect to the reproductive efficiency. KAR

Flavourings

1156 Kirova (E), Gadjeva (D) and Rothe (M). Meat-like Maillard concentrates as flavouring agents of sausages. **Nahrung** 30(6); 1986; 645-650

Maillard type flavourings have been applied in a Bulgarian sausage in concn. between 0.25 and 1%. In the range of 0.5% the best improving effect on total flavour quality was registered caused by increasing several sensory attributes. No influence of the additive was found on the enzymatic digestibility and most of the tested chemical parameters. Thiol groups decrease while the content in carbonyl compounds is increased significantly and can be used as an index for the presence of the flavouring. AS

Preservatives

1157 Schwedt (G) and Schwadorf (K). HPLC aqnalysis of preservative agents in foodstuffs with comparison of methods (Photometry, GC, DC). **Deutsche Lebensmittel-Rundschau** 82(7); 1986; 209-216 (De).

UV and VIS photometry, DC, GC, and HPLC (RP and adsorption systems) are described in detail with reference to the analysis of allowed preservatives, benzoic, sorbic, formic and propionic acids, PHB esters, as well as o-hydroxybiphenyl, biphenyl and thiabenzadole. On a total of 28 food samples, both low and high fat content, analyzing procedures are examined with regard to their applicability. For the analyzation of benzoic and sorbic acids, extensive method comparisons are carried out; particularly HPLC procedures, in connection with sample preparation described in each case, find a very broad application. For the formic acid we utilized only enzymatic analysis, for the propionic acid only GC. AS

Sulphites

1158 Behre (LM). Sulphite food additives To ban or not to ban? **Dairy and Food Sanitation** 6(9); 1986; 386-390

Stabilizers

Carrageenans

1159 Hendrickx (M), Vanden Abeele (C), Engels (C) and Tobback (P). Diffusion of glucose in carrageenan gels. **Journal of Food Science** 51(6); 1986; 1544-1546

From an experimental set-up with boundary conditions of an extended initial distribution the diffusion coeff. for glucose in a high K-content carrageenan gel was evaluated as a function of the carrageenan concn. (1, 2 and 4%) and temp. (0.0, 5.0, 10.0, 15.0, 25.0 and 36.0C). According to an Arrhenius-type equation, the activation energies at 1, 2 and 4% of carrageenan were calculated as 18.1, 17.4 and 19.1 kJ/mol. From these data it was concluded that carrageenan affects diffusion mainly by an obstruction effect. AS

Sweeteners

1160 Rymon Lipinski (GW). Sweeteners. **IFST Proceedings** 19(3); 1986; 112-118

This general type of article covers groups of sweet tasting products, properties and fields of application, present market situation and future prospects. Also covered bulk sweeteners and intense sweeteners. KAR

Aspartame

1161 Prudel (M), Davidkova (E), Davidek (J) and Kminek (M). Kinetics of decomposition of aspartame hydrochloride (Usal) in aqueous solutions. **Journal of Food Science** 51(6); 1986; 1393-1397, 1415

A scheme of aspartame hydrochloride decomposition in relation to pH and temperature which considered the possibility of formation of phenyl-alanyl aspartic acid dipeptide was suggested and confirmed experimentally. OES

Sorbitol

1162 Fleche (G) and Huchette (M). Isosorbide Preparation, properties and chemistry. **Starch/Starke** 38(1); 1986; 26-30

Isosorbide is obtained by dehydration of sorbitol and therefore can be considered as a valuable product from biomass. The acid-catalyzed reaction gives rise to different anhydro-compounds, but also to polymer-like products. Kinetics of sorbitol decrease, followed with the help of HPLC, shows, remarkably, the different reactions taking place during the dehydration. Physicochemical properties of isosorbide are also discussed: melting temp, sp. gr., solubility. Emphasis is put on stereochemistry aspect, pointing out the **endo-exoposition** of hydroxyl groups **versus** those of other isomers: **exo-exo** for isoiodide and **endo-endo** for isomannide. Some other properties such as: hygroscopicity and thermal stability are also discussed. The chemical reactivity of the mol. is then described and some reactions analyzed, proving the interest of the cyclic conformation. Finally, a review of known applications is presented. AS

CEREALS

1163 Bagneris (RW), Gaul (JA) and Ware (GM). Liquid chromatographic determination of zearalenone and zearalenol in animal feeds and grains, using fluorescence detection. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 894-898

A liquid chromatographic (LC) method was developed for the detn. of zearalenone and zearalenol in grains and mixed animal feeds. Samples are extracted with chloroform and purified by a base-acid liquid-liquid partition. Zearalenone and zearalenol are separated by reverse phase LC and determined by fluorescence detection, excitation wavelength 236 nm with a 418 nm cutoff filter. The method was applied to the detn. of zearalenone and zearalenol in 395 survey samples of corn, oats, barley, sorghum, silage, and finished feeds. The limit of detection is 10 ng/g for both toxins. The range of naturally occurring toxins found was 10-4000 ng/g. Average recoveries were 84% for zearalenone and 69% for zearalenol. Coeff. of variation were 24.6% for zearalenone and 30.8% for zearalenol for crop year 1980, and 28.3% for zearalenone and 22.0% forzearalenol for crop year 1981. AS

1164 Sawyer (LD) and Walters (SM). Gas chromatographic method for ethylene dibromide in grains and grain-based products: Collaborative study. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 847-851

1165 Scott (PM), Kanhere (SR) and Tarter (EJ). Determination of nivalenol and deoxynivalenol in cereals by electron-capture gas chromatography. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 889-893

Buckwheat

1166 Ikeda (K), Oku (M), Kusano (T) and Yasumoto (K). Inhibitory potency of plant antinutrients towards the **in vitro** digestibility of buckwheat protein. **Journal of Food Science** 51(6); 1986; 1527-1530

The inhibitory potency of dietary fibre sources, tannins, phytate and a protein protease inhibitor on the **in vitro** pepsin-pancreatin digestibility of buckwheat globulin was compared. The protein inhibitor exhibited the highest inhibitory capacity and phytate the lowest among the substances tested. DES

Rice

1167 Chinnaswamy (R) and Bhattacharya (KR). Characteristics of gel-chromatographic fractions of starch in relation to rice and expanded rice-product qualities. **Starch/Starke** 38(2); 1986; 51-57

Starch from waxy and nonwaxy rices was separated on Sepharose. In nonwaxy rice, the major (void volume) fraction stained a varying shade of blue with iodine depending on the sample. The water-insoluble amylose content as estimated in milled rice flour was highly positively correlated with the λmax of the iodine colour as well as with the "amylose" content of the fraction. Debranching with pullulanase showed that the fraction had the dual character of being both amylopectin and amylose. A second fraction was for the most part true amylose. The volume of expanded rice product seemed to increase with average mol. wt. of starch. The highest average mol. wt. of starch corresponded to analytical values of water-insoluble amylose as estimated in rice flour and the same corresponded to the greatest expansion volume. AS

1168 Ramarathnam (N), Osawa (T), Kawakishi (S) and Namiki (M). Effect of oxidative damage induced by Gamma-irradiation on germination potentials of rice seeds. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 8-11

Gamma-irradiation, for accelerated aging of four Indica and four Japonica rice seeds, with and without intact hull, was carried out. At an irradiation dose of 20 kGy, all of the var. with intact hull had lower electron spin resonance (ESR) signal intensity and thiobarbituric acid (TBA) values compared to those irradiated after dehulling. At a lower dose of 10 kGy, rice seeds irradiated with intact hull had higher germination potentials, while the ones irradiated after dehulling had lower germination abilities. The overall susceptibility to oxidative damage was less in the case of Indica' rice seeds, indicating that the antioxidative defense system in Indica rice hull offered better protection to rice seeds in overcoming the oxidative stress than Japonica rice hull. AS

Wheat

1169 Iskander (FY) and Morad (MM). Minerals and protein in four hard red winter wheat varieties and fractions derived therefrom. **Journal of Food Science** 51(6); 1986; 1522-1526

Whole wheat grain from hard red winter wheat cv (Scout 66, Vona, TAM 101 and TAM 105) and six ground fractions separated according to particle size were analysed for 25 elements by instrumental neutron activation analysis, the concn. of which were reported. DES

1170 Jankowski (T) and Rha (C K). Differential scanning calorimetry study of the wheat grain cooking process. **Starch/Starke** 38(2); 1986; 45-48

1171 Kitic (D), Resnik (SL) and Chirife (J). Solutions of lithium chloride as reference sources of wheat activity above 0.6 and between 5 C and 45 C. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 272-274

1172 Lee (U-S), Jang (H-S), Tanaka (T), Oh (Y-J), Cho (C-M) and Ueno (Y). Effect of milling on decontamination of **Fusarium** mycotoxins nivalenol, deoxynivalenol, and zearalenone in Korean wheat. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 126-129

Samples of wheat naturally contaminated with **Fusarium** mycotoxins were obtained from fields and mills in Korea and were milled by the Buhler test mill and an industrial-scale mill, respectively. Each of the milling fractions was analysed for nivalenol (NIV) and deoxynivalenol (DON) by gas chromatography with an electron capture detector and for ZEN by high-performance liquid chromatography with a fluorescence detector. NIV, DON, and ZEN were found throughout all fractions, but ZEN was not detected in break and reduction flour fractions in the industrial mill. The highest concn. of NIV was found in the bran, and DON and ZEN were in the shorts. The lowest concn. of NIV was found in the reduction flour, and DON and ZEN were in the break flour. Milling was not effective in removing NIV, DON and ZEN from the naturally contaminated wheat, but the effect on its concn. in the samples varied. AS

1173 Popineau (Y), Le Guerroue (JL) and Pineau (F). Purification and characterisation of ω-gliadin components from common salt. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 266-271

Eight ω-gliadin components were separated by ion exchange chromatography on Sulphopropyl-Trisacryl M from a whole ω-gliadin fraction. This procedure produced large quantities of several components. Furthermore, residual glutenin, strongly adsorbed on the gel, was removed from gliadin fractions. According to the stable properties of the chromatography gel used, it will be possible to scale up the method. All the components isolated were characterised by their electrophoretic mobilities at acid pH, their amino acid compositions and especially their tryptophan contents and mol. wt, determined by SDS-PAGE and gel filtration in the presence of 6 M CuCl. These were compared with ω-gliadin components previously purified in other laboratories. The existence of four types of ω-gliadins at least, of different mol. wt. and/or amino acid compositions, was demonstrated. AS

1174 Tosi (E), Re (E), Tapiz (L), Mácias (S) and Ferreghini (M). Drying of wheat in cross-flow dryer. Properties that are modified in grain and flour. **Revista de Agroquimica y Tecnologia de Alimentos** 26(1); 1986; 139-147 (Es).

Changes in some properties of wheat grain and flour produced by thermal treatment of grain in cross-flow dryers were studied in the air temp. range 90-150 C, in order to select the most appropriate variables as index of wheat damage. The most sensitive variable was the alveographic ratio P/G, followed by loaf volume, flour strength, Zeleny index and wet gluten content. Wt. per hectolitre, flour yield, water absorption and total protein content of the flour do not depend on the air temp. AS

1175 Ware (GM), Francis OJ), Carman (AS), Kuan (SS). Gas chromatographic determination of deoxynivalenol in wheat with electron capture detection. Collaborative study. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 899-901

Ten laboratories participated in a collaborative study of a method for the detn. of deoxynivalenol in wheat by gas chromatography with electron capture detection. Each laboratory analyzed 6 samples in duplicate. Each collaborator received samples spiked at the 100.3, 501.3, and 1002.6 ng/g levels; a control sample; and 2 naturally contaminated samples. The av. recovery (outliers excluded) for the spiked samples was 92.2%. The mean repeatability and reproducibility, respectively, were 32.2 and 41.3% for the spiked samples and 30.9 and 47.6% for the naturally contaminated samples. The method was adopted official first action. AS

Wheat flour

1176 Rangaswamy (JR) and Sasikala (VB). Bound residues of phosphine in milled products of wheat. **Journal of Food Science and Technology, India** 24(1); 1987; 26-32

Whole wheat flour (**atta**), refined wheat flour (**maida**) and semolina (**soji** or **rawa**) were fumigated with phosphine and the residue and P content were determined immediately after fumigation and 2, 4 and 7 days of airing and 60 days storage of these aired samples. The computed residue of phosphine is always higher than the determinable level in all these products irrespective of days of airing. However, after 60 days of storing of aired samples phosphine could not be determined but the computed values showed the presence of phosphine in whole wheat flour and semolina but not in refined wheat flour. This difference along with the absorption bands (of spectra of phosphine residue - nitrate chromophore) other than the one at 400 nm have provided evidennces for the presence of chemically bound phosphine. Irrespective of the period of airing the commodity will hold a definite amount of computed residue of phosphine and these values in 2, 4, and 7-day aired smaples were in the range of 0.31 to 0.39 ppm in **atta,** 0.13 to 0.19 ppm in **maida** and 0.22 to 0.28 ppm in semolina. These computed residues arise due to slow and continuous decomposition of bound residues. **Tribolium castaneum** was allowed into flasks containing the 7-day aired atta, maida and semolina. At the end of 7 wk 16% mortality was observed in **atta** with 0.06 ppm bound residue compared to 3% mortality in soji with 0.04 ppm bound residue. So it is concluded that phosphine forms bound residues with wheat products and the amount depends upon the type of product. KAR

Wheat starch

1177 Jankowski (T) and Rha (CK). Retrogradation of starch in cooked wheat. **Starch/Starke** 38(1); 1986; 6-9

Retrogradation phenomenon in cooked wheat grain was investigated by means of Differential Scanning Calorimetry (DSC) and mechanical compression tests. The extent of starch retrogradation as measured by endotherm increased with time. More importantly, the onset, peak and conclusion temp. are dependent on the storage temp. and are significantly lower for grain stored at lower temp. The firmness of the grain due to starch crystallization as indicated by the elastic modulus also increased with time and was higher at lower storage temp. Lowered storage temp. not only accelerates starch recrystallization and thus firming process of the cooked grain, but also seems to generate a different organization in the ordering of the starch. AS

1178 Reinikainen (P), Suortti (T), Olkku (J), Malkki (Y) and Linko (P). Extrusion cooking in enzymatic liquefaction of wheat starch. **Starch/Starke** 38(1); 1986; 20-26

MILLETS

Corn

1179 Ram (BP), Hart (LP), Shotwell (OL) and Pestka (JJ). Enzyme-linked immunosorbent assay of aflatoxin B1 in naturally contaminated corn and cottonseed. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 904-907

1180 Singer (GM) and Ji (C). Biomimetic synthesis of N-Nitroso-N-(1-methylacetonyl)-3-methylbutylamine. An unusual carcinogenic nitrosamine in foods of Linxian, China. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 130-132

The origin of NMAMBA [N-nitroso-N-(1-methylacetonyl)-3-methylbutylamine], a carcinogen identified in moldy foods in Linxian, Henan, China, has been controversial. We find that it may arise by the interaction of isoamylamine, a decarboxylation product of leucine, and acetoin (3-hydroxy-2-butanone), a known constituent of corn. Oxidative nitrosation in dilute sulphuric acid leads directly from the amino alcohol to the nitrosamine ketone. AS

Corn flour

1181 Gunjal (BB), Wankhede (DB), Katake (RS) and Taur (AT). Water vapour adsorption by corn and rice flours. **Journal of Food Science and Technology, India** 24(1); 1987; 38-40

Equilibrium moisture content of corn flour (cv. Ganga-5) and rice flour (cv PBN-1) was studied at 15, 25 and 40 C and at 11 to 89% RH. At a given temp. and RH, products having higher starch and protein contents had higher equilibrium moisture. Corn flour has higher sorptive capacity than rice flour due to the higher content of starch and protein in the former. Free energy change (the energy required to transfer water mol. from vapour state to the solid surface or vice versa) calculated using the test data for corn flour and rice flour ranged from 950 to 70 kcal/kg mol and 749 to 45 kcal/kg mol resp. at 6 to 20% moisture. The isosteric heat calculated at 8 to 22% moisture decreased from 14.54 to 11.99 kcal/g mol for corn flour and 13.65 to 11.04 kcal/g mole for rice flour. The net heat of absorption was 4.07 to 0.51 kcal/g mol. for corn flour and 3.17 to 0.56 kcal/g mole for rice flour for moisture contents of 8 and 22%. Out of the four isotherm equations tested Smith's equation gave the best fit for corn flour and rice flour. KAR

Corn meal

1182 Chung (HJ) and Fields (ML). Production of riboflavin and vitamin B12 by **Bacillus megaterium** ATCC 13639 and **Enterobacter aerogenes** in corn meal. **Journal of Food Science** 51(6); 1986; 1514-1517

Corn starch

1183 Matsunaga (A) and Kainuma (K). Studies on the retrogradation of starch in starchy foods. Part 3. Effect of the addition of sucrose fatty acid ester on the retrogradation of corn starch. **Starch/Starke** 38(1); 1986; 1-6

A model of retrograded starch mol. was proposed in our previous paper. The effect of the addition of n-butyl alcohol or sucrose fatty acid on the retrogradation of starch was studied in this paper. The samples were prepared by repeating freeze-thaw cycles with or without addition of complex forming agents. The samples were treated with 16% sulphuric acid as by **Nageli** amylodextrin preparation or a mixture of beta-amylase-pullanase. The residues of the acid or enzyme treatment were chromatographed. From the results of iodine titration, degree of gelatinization, X-ray diffraction, and chain length distribution, it is discussed how the helix forming agents react with fractions of starch and prevent the retrogradation. A schematic model of the retrograded starch with helix forming agents is also proposed. AS

Sorghum

1184 Elmalik (M), Klopfenstein (CF), Hoseney (RC) and Bates (LS). Effects of germination on the nutritional quality of sorghum grain with contrasting kernel characteristics. **Nutrition Reports International** 34(6); 1986; 941-950

Six sorghum cv. having different endosperm types and texture were used. The content of essential amino acids except leucine, increased as a result of 5-day germination, with the most favourable enhancement occurring in the highly corneous cv. Isoleucine supplementation made diets less palatable, resulting in lower feed consumption and lower wt. gains. Germination of sorghum for two days did not significantly influence rat growth or feed efficiency but apparent protein and dry matter digestibility were enhanced. KAR

PULSES

1185 Chowdhury (AR), Banerji (R), Tiwari (SR), Misra (G) and Nigam (SK). Studies on leguminous seeds III. **Fette Seifen Anstrichmittel** 88(4); 1986; 144-146

The seeds of 20 plant sp. belonging to Papilionaceae were studied for their fatty acid and mineral composition. The fat and protein contents ranged from 2-30% and 21-45% respectively. The seed oils were found rich in C-18 unsaturated acid (40.5-77.2%). AS

Chick-peas

1186 Bencini (MC). Functional properties of drum-dried chick-pea (**Cicer arietinum** L.) flours. **Journal of Food Science** 51(6); 1986; 1518-1521, 1526

The chemical and functional properties of three precooked flours prepared from citric acid- and sodium bicarbonate-treated chick peas were compared with those of raw chick-pea and soybean flours. The nitrogen solubility and foaming capacity of the precooked flours were markedly reduced by processing. The acid-treated flours showed higher values of oil absorption and viscosity than the sodium bicarbonate-treated flour, but the latter had a higher bulk density. Even at 10% concn. the acid-treated flour slurries manifested very low viscosities (about 11 centripoises). No significant difference was detected in the water absorption and gelation capacity of the precooked flours. AS

Cowpeas

1187 Akinyele (IO), Onigbinde (AO), Hussain (MA) and Omololu (A). Physico-chemical characteristics of 18 cultivars of Nigerian cowpeas (**V. unguiculata**) and their cooking properties. **Journal of Food Science** 51(6); 1986; 1483-1485

The cooking time, swelling capacity, leached solid, per cent seed coat, seed density, amylose, tannins, proteins and soluble sugars of 18 cv. of cowpeas (**V. unguiculata**) were analysed and their inter-relationship, with special reference to the cooking time was discussed in detail. OES

Dry beans

1188 Koehler (HH), Herrick (HE) and Burke (DW). Differentiating the lectin activity in twenty-four cultivars of dry beans (**Phaseolus vulgaris** L.). **Journal of Food Science** 51(6); 1986; 1471-1475

This study showed that a combination of haemaglutination tests and SDS-polyacrylamide gel electrophoresis was suitable for rapid, inexpensive screening of dry beans for toxic lectins. OES

Peas

1189 Taurick (GR) and Mclellan (MR). Use of sensory analysis for the observation of single gene effects on the quality of canned peas (**Pisum sativum** L.). **Journal of Food Science** 51(6); 1986; 1565-1566

OILSEEDS AND NUTS

Cottonseeds

1190 Akdemir (H), Demir (I), Emiroglu (S) and Marquard (R). Investigations about quality properties of cottonseed of cultivation material from Turkey. **Fette Seifen Anstrichmittel** 88(4); 1986; 148-151 (De).

In Turkey about 25% of the vegetable oils, produced in the home country, are obtained from cottonseed. Therefore the fatty content, the fatty acid composition of the oil but also the protein content of the seed are predominant for a cultivation improvement. In single plants of the investigated material in the kernels maximal fat contents of 42.5% and maximal protein contents of 51.4% were found and the highest amount of linoleic acid was 64.8%. The fat content showed a high heritability and only a small negative correlation to the protein content so that a simultaneous increase of both substances seems to be possible by cultivation measurements. AS

Poppy seeds

191 Srinivas (H) and Narasinga Rao (MS). Studies on the low molecular weight proteins of poppy seed (**Papaver somniferum** L.). **Journal of Agricultural and Food Chemistry** 35(1); 1987; 12-14

The low mol. wt. proteins of defatted poppy seed meal were separated from the high mol. wt. fraction (10S) by chromatography on Sepharose 6B. Gel electrophoresis showed that the proteins were heterogeneous and consisted of at least five protein fractions. In sedimentation velocity a single diffuse peak was observed with $S_{20,w}$ value of 0.8S. The proteins contained 3.1% carbohydrate and no phosphorus. The amino acid composition of low mol. wt. proteins was different from that of the 10S protein in having higher amounts of cysteine, glutamic acid, and arginine and lower amounts of aspartic acid, leucine, isoleucine, valine, histidine, tryptophan, and phenylalanine. The mol. wt. of the proteins determined by gel filtration technique was 14, 500. The low mol. wt. proteins had higher helical content (35%), unlike the 10S protein which had very little helix (5%). Attempts to isolate the homogeneous fractions by DEAE- or CM-Sephadex chromatography did not succeed. AS

Rapeseeds

1192 Schutze (I). Analysis of the content of erucic acid in rapeseed. I. **Lebensmittelindustrie** 33(4); 1986; 174-176 (De).

The author gives a survey of the internationally actual test methods of the content of erucic acid. She introduces three methods in detail which were developed in the VEB Kombinat Ol und Margarine. Test errors and recommendations for the work of the Technical Control Organization (TKO) are discussed in addition. AS

Soybeans

1193 Rothenbuhler (E) and Kinsella (JE). Disulphide reduction and molecular dissociation improves the proteolysis of soy glycinin by pancreatin **in vitro**. **Journal of Food Science** 51(6); 1986; 1479-1482, 1590

1194 Yoshida (H) and Kajimoto (G). Effects of microwave heating on the molecular species of soybean triacylglycerols. **Journal of Food Science** 51(6); 1986; 1476-1477, 1490

Microwave heating of whole soybeans resulted in an apparent increase of the total lipids. Mol. sp. of triacylglycerols were isolated from total lipids by a combination of silicic acid column chromatography and silver nitrate thin layer chromatography (TLC). Fifteen mol. sp. of triacylglycerols were still found in whole soybeans following heat treatment. Microwave heating for about 5 min did not change all mol. sp. of soybean triacylglycerols nor cause a loss of unsaturated fatty acids. However, heat treatment for 8 min caused a significant decrease not only in mol. sp. containing more than four double bonds, but also in the amount of diene and triene present in a triacylglycerol. AS

Soy products

Soy milk

1195 Ang (HG), Kwik (WL), Lim (KK Theng (CY). Evaluation of soy milk and other soy products derived from defatted soymeal. **Food Chemistry** 22(2); 1986; 165-175

An evaluation study was carried out on soy milk reconstituted from soy milk powder which in turn was obtained through spray-drying of soy milk formulated from defatted soy meal. The colour and stability of the reconstituted soy milk were found to be dependent on the relative levels of oil and emulsifier added to the formulation. A_2^3 factorial experiment was designed to determine the effect of protein,m oil and emulsifier levels on the colour and stability of the soy milk. Using a Hedonic preference test, the acceptability of the reconstituted soymilk formulated on the basis of results from the A_2^3 factorial experiment was assessed and compared with commercial samples of soy milk. AS

TUBERS AND VEGETABLES

Root vegetables

1196 Bradbury (JH) and Singh (U). Thiamin, riboflavin, and nicotinic acid contents of tropical root crops from the South Pacific. **Journal of Food Science** 51(6); 1986; 1563-1564

The thiamine, riboflavin and nicotinic acid contents of several tropical root crops from the South Pacific were determined for fresh as well as dried (40 C) crops. Loss of vitamins on drying and various methods of cooking were also reported. OES

Carrot juice

1197 Munsch (MH), Simard (RE) and Girard (JM). Effect of blanching, degree of grinding and enzymatic maceration on the mineral and nitrogen content of carrot juice. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 240-248 (Fr).

1198 Munsch (MH), Simard (RE) and Girard (JM). Effect of blanching, degree of grinding and enzymatic maceration on the yield and quality of carrot juice. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 229-239 (Fr).

Radish

1199 Khan (SU), Kacew (S), Dupont (S), Stratton (GDJr) and Wheeler (WB). Bioavailability in rats of bound residues from radishes treated with either radiolabeled dieldrin or carbofuran. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 89-93

Tubers

Cassava

1200 Moorthy (SN) and Ramanujam (T). Variation in properties of starch in cassava varieties in relation to age of the crop. **Starch/Starke** 38(2); 1986; 58-61

Cassava starch extracted from six var. at different period of growth was examined for various physicochemical properties. The granule size increased in all the six var. upto 6th month from time of tuber initiation and thereafter remained almost constant. The amylose content and reducing values did not vary much at different stages of growth. The swelling volume and swelling power of starch showed large variations particularly after 10th month. Such changes of four var. were not noticed in other varieties. Associative binding forces of starch mol. largely determine the stability characteristics of starch under varied environmental conditions. AS

Potatoes

1201 Garrote (RL), Silva (ER) and Bertone (RA). Losses by diffusion of ascorbic acid during water blanching of potato tissue. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 263-265

Ascorbic acid losses in potato cylinders (diameter: 10 mm; length; 80 mm) in water at 50, 65, 80 and 100 C for different periods of time were studied. In general, an increase in temp. produced a higher ascorbic acid loss, particularly between 50 and 65 $degree$ C. Experiments were carried out to detect enzymatic and thermal degradation of ascorbic acid; these losses were found to be negligible. The conclusion is that during water blanching the losses are mainly by diffusion. The estimated apparent diffusivities of ascorbic acid in potato were $1.53 \times 10^{-10} m^2$/sec at 50 C, $9.32 \times 10^{-10} m^2$/sec at 65 C, $14.27 \times 10^{-10} m^2$/sec at 80 C and $21.43 \times 10^{-10} m^2$/sec at 100 C. In the 65-100% C range the activation energy of the diffusion process was 5953 cal/mol. AS

1202 Rama (MV) and Narasimham (P). Comparative efficacies of chemical sprout inhibitors and vapour heat treatments on the control of sprouting in stored potatoes. **Journal of Food Science and Technology, India** 24(1); 1987; 40-42

Potatoes were given pre-harvest spray of maleic hydrazide (MH) containing 0.1% Tween-80 and 250 ppm benlate at 1000 and 200 ppm, and post harvest treatment with sodium salt of naphthalene acetic acid (NAA), methyl ester of naphthalene acetic acid (MENA), iso-propyl-N-chlorophenyl carbamate (CIPC) and tetrachloronitrobenzene (TCNB) each at 1000 ppm level and stored at 22-35 and 20 C for 3 wk and at 10 C for 6 wk. Potatoes 5 wk after harvest were given vapour heat treatment (VHT)at 60 C with 95 plus or minus 5% RH for 60 min and stored at 22-35, 20 and 10 C. After 3 wk one lot from each of the above temp. was given a second VHT at 60 C for 60 min. Potoatoes were observed periodically for sprout yield, spoilage and physiological loss in wt (PLW). Of the five chemicals, MENA and NAA at 1000 ppm and MH at 2000 ppm reduced the sprout yield effectively at the three storage temp.; however MENA was found most effective. VHT was most effective at 22-35 C than at 20 and 10 C; two treatments are needed to significantly reduce the sprout yield at 20 and 10 C. No treatment has significantly reduced the PLW compared to the control. The rate of spoilage in VHT is same as in any chemical treatment. It is concluded that VHT applied twice was as effective as MH at 2000 ppm when the reduction in sprout yield was 83 and 71% respectively when stored at 22-35 C. KAR

Potato starch

1203 Ali (SZ) and Kempf (W). On the degradation of potato starch during acid modification and hypochlorite oxidation. **Starch/Starke** 38(3); 1986; 83-86

Potato starch (35-40% slurry) was (i) acid modified with hydrochloric acid (0.5-N, 50 C, upto 4.5 h) and (ii) oxidized using sodium hypochlorite (7.5 to 70 mg Clorine/g starch, 38 C, 2.5 h). Starch degradation over the treatment range was followed by: the number average mol. wt. M_η , alkali fluidity number (AFN), iodine binding capacity (IBC), ash and sodium content of the resultant acid modified starch; and carboxyl content, M_η~~sub n/~~, AFN, ash and sodium content of oxidized starch. AS

1204 Komiya (T) and Nara (S). Changes in crystallinity and gelatinization phenomena of potato starch by acid treatment. **Starch/Starke** 38(1); 1986; 9-13

The hydrolysis of potato starch by 1-N sulphuric acid 30% ethanol aqueous solution at 45 C increased linearly with increasing of hydrolysis time for 14 d. The relative crystallinity of native starch showed 0.343 and 0.350 by symmetrical reflection and transmission techniques, resp. The increasing ratio of relative crystallinity to hydrolysis time corresponded very closely with that of 1/hydrolysis residue up to 14 d. These facts suggest that only the amorphous region of the starch granules will be hydrolyzed by the acid. By differential scanning calorimetry the calorimetric enthalpy of potato starch containing about 200% moisture content was found to stay largely unchanged by acid treatment for 6 d. The swelling power at 70 and 80C of potato starch reached to the min. value and, moreover, from the gel-chromatogram patterns of the acid-treated starches, the crystalline region of the starch granules may begin to deteriorate slightly by acid treatment for more than 6 d, although the relative crystallinity by the X-ray diffraction method increased slightly with passing of hydrolysis time. AS

1205 Samotus (B), Leja (M), Scigalski (A), Dulinski (J) and Siwanowicz (R). Analytical remarks to explain some discrepancies in the determination of dry matter and starch from potato tubers density. **Starch/Starke** 38(1); 1986; 14-19

1206 Senouci (A) and Smith (AC). The extrusion cooking of potato starch material. **Starch/Starke** 38(3); 1986; 78-82

The effect of extrusion cooking on the pasting properties of potato starch materials is examined using a Couette rheometer. The dispersion viscosity of aqueous dispersions of potato starch, pregelatinized potato starch and commercial potato granules has been investigated. The effect of extrusion moisture and progress down the extruder on this property Has been studied. The dispersion viscosity reponse is related to the gelatinization and disruption of starch granules. Extrusion at high moisture levels leads to high viscosity dispersions tending to that of gelatinized starch whereas low moisture levels result in lower viscosity dispersions. AS

Vegetables

1207 Garcia-Roche (MO) and Ilnitsky (A). Nitrate content in Cuban vegetables in relation to nitrate intake by the population. **Revista de Agroquimica y Tecnologia de Alimentos** 26(1); 1986; 115-122

The content of nitrate and nitrite were determined in 879 samples of edible part of banana and 18 vegetables grown in Cuba. The level of nitrate in the samples of the same product showed high variability and the corresponding mean values were remarkably different (from 30.9 ppm sodium nitrite for tomato to 2,710.8 ppm for root beet). Highest levels were obtained for **Cruciferae** and **Chenopodiaseae** families. These results agree with those reported in other countries. The decrease in nitrate levels caused by cooking were also determined; values between 40% (squash) and 57.7% (carrot) were found. The nitrite levels were low (means values between < 0.5 ppm and 2.7 ppm) and without toxicological significance. These results confirm that some vegetables are an important source in the nitrate intake. The incidence of bananas and vegetables on the nitrate intake by Cuban population is discussed, and the necessity of stabilising tolerance limits for a better control on the nitrogen fertilization is suggested. AS

Brassica

1208 Bradfield (CA) and Bjeldanes (LF). High-performance liquid chromatographic analysis of anticarcinogenic indoles in **Brassica oleracea**. Journal of Agricultural and Food Chemistry 35(1); 1987; 46-49

Vegetable of the **Brassica** genus contain an (indolylmethyl)glucosinolate, glucobrassicin (GB). The autolysis products of this glucosinolate include indole-3-carbinol(3C), indole-3-acetonitrile (IAN), and 3,3′-diindolylmethane (I33′), all of which inhibit chemically induced neoplasia in rodents. Analytical methodology, utilizing RP-HPLC, was developed to quantify this potentially important series of indolylic metabolites in foods and to describe the thioglucosidase-mediated autolytic process. Our results demonstrate that 13C is the major GB metabolite generated when plant material is disrupted, although it is not stable in the autolytic milieu (84% conversion to other products in 24 h). Additionally, these results indicate that common cooking practices employed on cruciferous vegetables do not inactivate the thioglucosidase to a significant extent, and thus autolytic products are likely to occur in cooked as well as raw vegetables. AS

1209 Kawakishi (S) and Kaneko (T). Interaction of proteins with allyl isothiocyanate. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 85-88

Interaction of allyl isothiocyanate (AITC) with proteins and the digestibility of a protein-AITC adduct were studied in detail as a model reaction of isothiocyanate and protein in crushed **Brassica** seeds. Insulin, bovine serum albumin (BSA), ovalbumin and lysozyme as model proteins reacted slowly with AITC to cleave the disulphide bond in their cystine moieties followed by polymer formation. Besides this action, AITC also attacked free amino groups of lysine and arginine residues in protein to form their thiourea-like derivatives, detected by amino acid analyses and determination of the free amino group. Proteolytic digestibility of the protein-AITC adduct was investigated on a BSA-AITC adduct using trypsin, chymotrypsin, and pepsin. Digestibilities with trypsin and chymotrypsin were decreased markedly, but not so significant with pepsin. The reasons were considered as follows: The former attacked the peptide moieties containing basic and aromatic amino acids, which were easily modified with AITC, but the latter have a wide action program compared with the former. AS

Cucumbers

1210 Chan (HTJr). Heat inactivation of the ethylene-forming enzyme system in cucumbers. **Journal of Food Science** 51(6); 1986; 1491-1493

Curcurbita maxima

1211 Andersen (JF). Composition of the floral odour of **Cucurbita maxima** Duchesne (Cucurbitaceae). **Journal of Agricultural and Food Chemistry** 35(1); 1987; 60-62

The floral volatiles from two cv. of **Cucurbita maxima** Duchesne (squash) have been identified by vaccum steam distillation and gas chromatography-mass spectrometry. Spectral data were obtained for 31 major components, and the structures of 22 of these were verified by comparison with authentic standards. The mixtures were comprised of low mol. wt. aliphatic alcohols and aldehydes, monoterpenoids, sesquiterpenoids, indole, and aromatic alcohols, aldehydes, and methyl ethers. The aromatic are similar to known attractants of cucurbit-feeding beetles in the chrysomelid genus **Diabrotica** (corn rootworms and cucumber beetles), and indole has previously been determined to be an attractant of these insects. AS

Leafy vegetables

1212 Savangikar (C) and Ohshima (M). Application of **in vitro** methods to assess the nutritive value of leaf protein concentrates. **Journal of**

Agricultural and Food Chemistry 35(1); 1987; 82-85

Sixteen leaf protein conc. (LPC) were prepared from different crops by different processes and either freeze dried or oven dried in the 1983-1985 seasons. Total lysine and chemically available lysine of these samples were estimated. Biological assay parameters such as N retention and apparent digestibility were evaluated. Total lysine and chemically available lysine show good correlation with results from biological assay. Predicted biological nutritive values show good agreement with those from **in vitro** studies. AS

Sauerkraut

1213 Buckenhuskes (H), Schneider (M) and Hammes (WP). Lactic acid fermentation of vegetables with special regard to the production of sauerkraut. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(1/2); 1986; 42-53 (De).

Worldwide, even in the industrialized countries, there is an improved significance of the lactic acid fermentation of vegetable crops. To explain the production of lactic acid fermented vegetables the topical technology of the production of sauerkraut is pointed out. The microbial processes that appear under the conditions of the modern short-time-fermentation are described, furthermore the influences on the development of microorganisms during the fermentation of cabbage in small packages is explained. Finally a description of the experiences on the use of starter cultures for sauerkraut processing is given. AS

Tomatoes

1214 Lasztity (R), Abd El Samei (M) and El Shafei (M). Biochemical studies on some non conventional sources of protein. Part I. Tomato seeds and peels. **Nahrung** 30(6); 1986; 615-620

Tomato seeds and skin wastes contain considerable amounts of protein (16.6, 5.7%) respectively. After protein hydrolysis from both seeds and peels the presence of 17 amino acids was stated. The amino acid scores (chemical scores) to tomato pomace were calculated using the FAO/WHO provisional amino acid scoring pattern and reasonable biological value was confirmed. The essential amino acid content and biological value of seed proteins are higher than that of skin proteins. Fe, Zn, Cu and Mn in seeds and peels were predominant among the micro-minerals. K and P were found to be present in greater quantities than Na in seeds and peels. AS

1215 Martin (A), Jimenez (L), Iglesias (L) and Uceda (JL). Kinetic study of the freeze-drying of a type of "gazpacho". I. Sublimation. **Revista de Agroquimica y Tecnologia de Alimentos** 26(1); 1986; 157-162 (Es).

The kinetics of ice sublimation in the freeze-drying of "gazpacho" (tomato 65.0%, egg 21.0%, olive oil 9.4%, vinegar 2.2%, salt 1.6%, and garlic 0.8%) was studied, applying a model based on heat transfer from the heat plate to the sublimation front. Two transport parameters - external heat transfer coeff. (h) and effective thermal conductivity of the dry layer (k_c)-were considered. Both parameters remained nearly invariable in all experimental conditions: their mean values were: $h = 5.32$ W/m^2/K$_c$ = $119.59.10^{-3}$ W/(m. K). The applied kinetic model reproduced the experimental results with errors less than 20%. AS

1216 Russell (LF). High performance liquid chromatographic determination of vitamin C in fresh tomatoes. **Journal of Food Science** 51(6); 1986; 1567-1568

Tomato sauce

1217 Costell (E), Calvo (C) and Duran (L). Sensory and instrumental measure of commercial fried tomato sauce consistency. **Revista de Agroquimica y Tecnologia de Alimentos** 26(1); 1986; 72-80 (Es).

Consistency of twelve samples of commercial fried tomato sauce were measured with both sensory and instrumental methods and relationships between them were analyzed. Sensory analysis were performed with a rank test and instrumental measurements with both a concentric cylinder viscometer and a Bostwick consistometer. Significant differences ($p < 0.01$) in the consistency of samples were found. The product flow is pseudoplastic and fit well to the Ostwald model ($r > 0.996$). A linear relationship was shown between consistency index (K) and Bostwick consistency ($r = -0.899$). The non-parametric Kendall correlation coeff. between sensory data and K values (-0.788) and between sensory data and Bostwick values (0.848) were significant ($p < 0.01$). Sensory differences on product consistency can be evaluated by both instrumental methods. AS

FRUITS

1218 Beuchat (LR). Extraordinary heat resistance of **Talaromyces flavus** and **Neosartorya** fischeri ascospores in fruit products. **Journal of Food Science** 51(6); 1986; 1506-1510

1219 Thomas (P). Radiation preservation of foods of plant origin. Part IV. Subtropical fruits: citurs, grapes, and avocadoes. **CRC Critical Reviews in Food Science and Nutrition** 24(1); 1986; 53-89

This review discusses the use of ionizing radiation for improving the storage of subtropical fruits sauch as citrus, grapes and avocadoes. Also considered in this review are application of radiation for the control of postharvest fungal diseases; irradiation effects on the physiology of the fruits (as related to respiration, ethylene production, changes in major chemical constituents, and quality) use of irradiation as an alternative treatment to chemical fumigants for disinfestation of citrus and avocados and future application of irradiation for preservation of some of these fruits. BV

Apples

1220 Cano (P), De la Plaza (JL) and Munoz-Delgado (L). Determination and persistence of several fungicides in postharvest-treated apples during their cold storage. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 144-147

This work describes the storage stability of fungicide residues usually used in postharvest treatment of pome fruits: Benomyl, Carbendazim, Methylthiophanate, Thiabendazole. Fungicide treatments were carried out by immersion of apples, cvs. Starking and Golden Delicious, in aqueous solutions of each fungicide. Fruits were stored at 0 C (cv. Starking) or 12 C (cv. Golden Delicious) both in 85-90% relative humidity. Samples were taken monthly, and each fungicide compound was determined in peel, two zones of pulp, and whole fruit by high-performance liquid chromatography. Benzimidazole residues decreased during storage; Thiabendazole, Benomyl, and Methylthiophanate residues found at 160 days of storage were 30-25% (cv. Starking) or 45-55% (cv. Golden Delicious) of the initial amount recovered after treatment. Carbendazian showed thegreater storage stability (40-65%) in both cultivars. Most residues were found on the peel, and amounts in the pulp decreased towards the core. AS

1221 Lau (OL), Liu (Y) and Yang (SF). Effects of fruit detachment on ethylene biosynthesis and loss of flesh firmness, skin colour, and starch in ripening 'Golden Delicious' apples. **Journal of the American Society for Horticultural Science** 111(5); 1986; 731-734

Prior to 25 Oct., about 4-6 wk (1983) or 3-5 wk (1984) after the normal commercial harvest period, 1-aminocyclopropane-1-carboxylic acid (ACC), ethylene-forming enzyme (EFE), and internal ethylene concn. (IEC) in 'Golden Delicious' (**Malus domestica** Borkh.) apples attached to the tree were low. Thereafter, they began to increase rapidly. The increase in both ACC and IEC was earlier in detached preclimacteric fruit than in fruit attached to the tree. The increase of EFE coincided with that of IEC in detached fruit kept at 20 C. Attached fruit subsequently attained a higher level of ACC but a lower level of IEC as compared to the detached fruit. The results suggest that inhibitor(s) supplied from the tree not only delayed the accumulation of ACC in the fruit but also greatly inhibited its subsequent conversion to ethylene. Once the ripening process is initiated, the development of EFE precedes the development of ACC synthesis in both attached and detached fruit. Since attached fruit showed a steady loss of flesh firmness, green skin colour, and starch, these changes did not appear to be related directly to the levels of ACC and internal ethylene. Detached fruit stored at 0 C accumulated ACC and increased IEC slightly earlier than those stored at 20 C. The magnitudes of these increases during subsequent storage at 0 C were, however, smaller than those at 20 C. AS

1222 Liu (FW). Responses of daminozide-treated 'Delicious' and 'Idared' Apples to simulated low-ethylene CA storage. **Journal of the American Society for Horticultural Science** 111(5); 1986; 716-719

Treatment of Delicious and Idared apples with daminozide significantly suppressed the ethylene production in simulated low-ethylene (< μl^{-1}) CA storage. KAR

1223 Sinha (KK) and Anjana Singh. Chemical changes in apples due to aflatoxin producing Aspergilli. **Journal of Food Science and Technology, India** 24(1); 1987; 44-45

Apple fruits (**Pyrus malus**) were inoculated with **A. flavus** (BG-19) and **A. parasiticus** (NRRL-3240) separately and incubated for 7 days at 96% RH. These strains reduced the level of total, reducing and non-reducing sugars, ascorbic acid and protein contents during infection. Depletion of sugar content was max. with **A. parasiticus** whereas max. loss of protein and ascorbic acid was with **A. flavus**. The phenol content of the fruit tissues increased due to infection by the fungi. KAR

1224 Walter (RH), Rao (MA), Cooley (HJ) and Sherman (RS). Characterization of hydrocolloidal extracts from apple pomace. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 253-257

Dispersions of solutes extracted from apple pomace conformed with the power law model that relates shearing stress to shearing rate. There was an exponential relationship between viscosity and concn. that was adaptable to Newtonian dispersions and between apparent viscosity and concn. that was adaptable to non-Newtonian dispersions. With time, relatively concentrated dispersions became increasingly non-Newtonian. In less concentrated dispersions, the consistency was progressively reduced, presumably by aggregation and precipitation of the newly formed, larger, macromolecular species. AS

Bananas

1225 Tan (SC), Lam (PF) and Abdullah (H). Changes of the pectic substances in the ripening of bananas(**Musa sapientum, cultivar Emas**) after storage in polyethylene bags. **ASEAN Food Journal** 2(2); 1986; 76-77

This is a short note describing the changes that occurred in the pectic substances during the ripening of bananas (**Musa sapientum** cultivar Emas) harvested at 7 wk (Group I) and 8 wk (Group II) and kept stored in sealed polyethylene bag for 6 days. The levels of pectin and pectate increased with time in both the groups. The level of protopectin decreased in Group I fruit while it did not do so in Group II during the softening process. OES

Citrus fruits

1226 Lafuente (MT), Tadeo (JL) and Tuset (JJ). Gas chromatographic determination of fenpropimorph residues in citrus fruit. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 859-862

A rapid gas chromatographic method for determining fenpropimorph residues in citrus fruit is reported. The fungicide is extracted with hexane after pH adjustment of the fruit homogenate. A short liquid-liquid partitioning process is performed before gas chromatography on an OV-17 column with nitrogen-phosphorus specific detection. The limit of detection of the method was 0.01 mg/kg, based on a 25 g sample. Recovery was always higher than 70%. Fenpropimorph residues in "Washington Navel" oranges and "Hernandina" clementine fruits dipped in a 1500 mg/L fungicide solution were determined. The fungicide remains mainly in the peel, with levels less than 0.1 mg/kg in the pulp. Fungicide residues in the peel decrease during storage, mainly in Washington Navel peel, where values decreased from 5.2 to 2.8 mg/kg. AS

Oranges

1227 El-Otmani (M), Arpaia (ML) and Coggins (CWJr). Developmental and topophysical effects on the **n**-alkanes of Valencia orange fruit epicuticular wax. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 42-46

The **n**-alkane fraction was high in the very immature fruit, decreased to min. values just before fruit colour break, and then increased again as fruit reached its max. size. Odd-numbered n-alkanes dominated on fruit from both quadrants but were somewhat more prevalent in the wax from northeast-(NE-)quadrant fruit. In both situations, the quantity of odd-numbered chains was minimum just before fruit colour break. A shift in the chain length from short to long was observed throughout fruit development, but a slight reversal toward short chains occurred after fruit maturation. Wax of fruit from the NE quadrant had higher amounts of shirt chains than wax of fruit from the southwest (SW) quadrant until fruit colour break, when the situation was reversed. This study supports earlier conclusions that fruit maturation and senescence are accompanied by relative and absolute increases in epicuticular wax n-alkanes. This study also suggests that SW-quadrant fruit are physiologically more advanced as they approach maturity than fruit from NE quadrant. AS

1228 Welti (JS) and Lafuente (B). Use of drying coadjuvants to improve the retention of aromas in freeze-drying and spray-drying of comminuted orange. **Revista de Agroquimica y Tecnologia de Alimentos** 26(1); 1986; 53-62 (Es).

The effect of maltodextrin (DE 39 and DE 45) and tragacanth gum addition on the aroma retention in the freeze-dried and spray-dried comminuted orange was determined. In general, as the proportion of maltodextrins was increased the retention of volatiles as ethanol (I) and **d**-limonene (II), was improved in both drying processes. But when tragacanth gum was used, a better retention of II was obtained only when the product was spray-dried. In the freeze-dried product with no coadjuvants, the retentions of I and II were 1 and 47% as compared to 35-45 and 73-74%, respectively, when the highest proportion (40% w/w)of the two experimented maltodextrins was used. In the spray-dried product the retentions of I and II were 0 and 61% with no coadjuvants and 23 and 95%, respectively when the indicated proportion of maltodextrins was used. Sensorial test confirmed the advantage of using malto-dextrins in freeze-drying and spray-drying of comminuted orange. The effect of the coadjuvant addition on the rheological behaviour of comminuted orange was also studied. AS

Mangoes

1229 Gunjal (BB) and Waghmare (NJ). Flow characteristics of pulp, juice and nectar of Beneshan and Neelum mangoes. **Journal of Food Science and Technology, India** 24(1); 1987; 20-23

By using the power low model the rheological constants of pulp, juice and nectar of Beneshan and Neelum var. of mangoes were calculated at 40, 50, 60 and 88 C. The apparent viscositycalculated at speeds of 0.5 to 50.0 rpm indicated a decrease with increase in temp. at identical speed; but the values for pulp were higher than those of juice and nectar in both the cv. Apparent viscosity was higher for the pulp, juice and nectar of Neelum var. Apparent viscosity decreased appreciably with increase of spindle speed and temp. in pulp, juice and nectar. Temp. decreased the consistency coeff. while it has no effect on the flow behaviour index. Highly significant positive correlation was observed between consistency coeff. and inverse absolute temp. KAR

Mangosteens

1230 Augustin (MA) and Nasir Azudin (M). Storage of mangosteen (**Garcinia mangostana L.**). **ASEAN Food Journal** 2(2); 1986; 78-80

The effect of storing Malaysian mangosteen at different temp. of 26, 8 and 4 C, on the chemical and physical characteristics of the fruits was reported. Judging by the appearance, quality and acceptability, fruits could be kept stored for a longer period (30 days) at 4 C and 8 C, than at room temp., where the fruits got spoiled after 10 days of storage. OES

Melons

Muskmelons

1231 Lester (GE) and Bruton (BD). Relationship of netted muskmelon fruit water loss to postharvest storage life. **Journal of the American Society for Horticultural Science** 111(5); 1986; 727-731

Watermelons

1232 Achinewhu (SC). Carbohydrate and fatty acid composition of fermented melon seeds (**Citrullus vulgaris**). **Journal of Food Science and Technology, India** 24(1); 1987; 16-19

Melon seeds were fermented for 5 days and the pH, acidity, soluble solids, N, carbohydrates and fatty acid composition were determined in the fermented seeds, pH, soluble solids, acidity and N increased with the progress of fermentation from 0 to 5 days. In the unfermented seeds sucrose (42.35 mg/g) and galactose (5.0 mg/g) predominated. Fermentation decreased the total disaccharide and increased the total monosaccharide content; maltose (11.56 mg/g), fructose (7.84 mg/g) and galactose (5.20 mg/g) were the major carbohydrates of the fermented seeds. Fatty acid composition of melon seed was not affected by fermentation except for a slight increase in the total unsaturated and total saturated fatty acids. The content of linoleic acid which is 62.86% did not change on fermentation. KAR

1233 Lasztity (R), Abd El Samei (MB) and El Shafei (M). Biochemical studies on some non conventional sources of protein. Part 2. Cucurbitaceae seeds. **Nahrung** 30(6); 1986; 621-627

Proximate composition of the 2 var. watermelon Chilian and Giza 1 besides **Cucumis melo** var. **Aegyptiacus** showed that the ratio of ash, crude fibre, crude protein and ether extract was as follows: (4.99, 3.86, 5.65); (2.56, 3.25, 1.17); (38.1, 39.4, 38.6) and (56.0, 54.2, 51.0) respectively. Protein hydrolysis for all the var. showed the presence of 17 amino acids and 15 in the free state. The acidic amino acid contents of the previous var. were high compared with others. Glutamic acid followed by aspartic acid, leucines and arginine were generally high in all var. Relating essential amino acids a high tryptophan content and relatively low threonine and methionine content is characteristic. Fe, Mn, Zn and Cu were predominant among the microminerals. Na was found to be present in smaller quantities than K and P. The implication of these findings are discussed. AS

Sodom apples

1234 Aworh (OC) and Nakai (S). Extraction of milk clotting enzyme from Sodom apple (**Calotropis procera**). **Journal of Food Science** 51(6); 1986; 1569-1570

A milk clotting enzyme with low proteolytic activity was extracted with ammonium sulphate, at 0.40-0.65 saturation, from sodom apple leaves. The enzyme with apparently a basic isoelectric point was activated by cysteine and was more active at 65 C than at 35 C. Milk clotting activity increased with pH at 65 C. Milk clotting activity increased with pH at 65 C. With the enzyme being almost twice as active at pH 6.4 as at pH 5.4-5.7. Storage at 4 C for 15 days resulted in a 30-50% loss in enzyme activity. AS

CONFECTIONERY, STARCH AND SUGAR

1235 Klaushofer (H). On the biotechnology of plants with fructosan content. **Starch/Starke** 38(3); 1986; 91-94 (De).

Inulin, as to its chemical nature, is a polyfructosane. Fructosanes (fructanes) are hardly less abundant in nature than starch. However, there are only few plants with sufficient fructosane content for technological utilization. The most important of them are Jerusalem artichoke and chicory. At first this paper deals with inulin and the homologous series of fructosanes. The importance of Jerusalem artichoke and chicory as agricultural crops and their respective peculiarities are pointed out as far as they are relevant for their use as technical source materials. Inulin containing plants are of interest with respect to the production of fructose and fructose syrup and as energy plants (production of ethanol). Chicory is particularly suitable as source material for fructose-(syrup-)production, Jerusalem artichoke mainly for the production of ethanol, although principally both product groups can be obtained from chicory roots and from topinambur bulbs. If inulin containing raw materials are used for ethanol production, it's of interest that yeast invertase splits polyfructosanes of higher molecular mass considerably more slowly than inulinase and yields are less satisfactory with **S. cerevisiae** and increasing inulin content in the mass. If yeast types are used containing inulinase and invertase, e.g. Kl. **fragilis** and **marxianus**, satisfactory fermentation can be obtained even with these types of mashes. AS

Starch

1236 Cereda (MP), Flors (A), Valles (S) and Alberola (J). Two phase anaerobic treatment of starch suspensions. I. Acidogenic phase. **Revista de Agroquimica y Tecnologia de Alimentos** 26(1); 1986; 101-108 (Es).

In order to obtain basic information to evaluate the feasibility of anaerobically treating high strength waste waters resulting from starch industries, the acidogenic stage of this treatment is studied. Using potato starch suspensions as a model system, results show that at T = 35 C this stage can be carried out discontinously in week batches. When a manioc flour naturally occurring flora was used as innoculum and the length of fermentation processes was limited to 5 d, the acidification rates exhibited values ranging from 0.68 g COD/l .d to 1.81 g COD/l_r .d. Gas mixtures of hydrogen and carbon dioxide (mean composition 90/10) were evolved in these fermentation processes. The max. value attained for the volumetric rate of gas generation was 0.27 l/l_r.d in a 4.5 day operation. AS

Amyloses

1237 Kennedy (JF), White (CA), Stevenson (DL) and Gutlin (K). Further methods for the characterization of natural amyloses as potential substrates for the assay of alpha-amylase. **Starch/Starke** 38(3); 1986; 86-91

Improved methods have been devised for the assessment of amylose samples and their suitability for conversion by dyeing with Cibacron Blue 3G-A to give insoluble coloured substrates for the assay of alpha-amylase. The new methods reported herein are based on: the determination of oligosaccharide component composition of water soluble fractions and enzymatic hydrolysates using gel permeation chromatography with Bio-Gel P-2 media; gel permeation chromatography to assess mol. wt. distributions; and enzymic degradation using alpha-amylase (1,4-alpha-D-glucan glucanohydrolase, EC 3.2.1.1) and beta-amylase (1,4-alpha-D-glucan maltohydrolase, EC 3.2.1.2). AS

Coleus

1238 Moorthy (SN). Studies on coleus starch. **Starch/Starke** 38(3); 1986; 77-78

Coleus starch was isolated by standard procedure and its properties studied. The granule size varies from 5 to 20 µ m with majority being in the range 8-16 µ m. The gelatinization temp. is 65-85 C. Viscosity of a 2% solution is 37 s (Redwood No.1). The viscosity increases to 56 s on cooling and remains steady afterwards. The sol. stability of the 2% solution is 72 h. The total amylose content is 33% of which soluble amylose is 12.8%. The swelling volume is 25 cm /g of starch, the reducing value in terms of ferricyanide number is 2.71. The results are discussed in comparison with other tuber starches. AS

Sugar

Fructose

1239 Dam (HE), Kieboom (APG) and Bekkum (H). The conversion of fructose and glucose in acidic media. Formation of hydroxymethylfurfural. **Starch/Starke** 38(3); 1986; 95-101

The effects of several variables on the reactions of fructose and glucose in acidic media have been studied at moderate reaction conditions. Glucose gives rise to the reversible formation of oligosaccharides (reversion products). Fructose was dehydrated into mixtures of hydroxymethylfurfural, levulinic acid, and humines. In addition, substantial reversible dimerisation of fructose occurred in acidic aqueous solutions. The dimerisation equilibrium, which is shifted by a decrease in the water concn. lowers the concn. of reactive fructose thereby affecting the selectivity of the dehydration process. p-Toluenesulphonic acid proved to be the most effective catalyst for the formation of HMF from fructose. No specific salt effects were found for the hydrochloric acid catalyzed dehydration of fructose. AS

Maltose

1240 Tegge (G), Richter (G) and Richter (G). Optimization of the production of maltose syrups by different enzyme combinations. **Starch/Starke** 38(2); 1986; 61-67 (De).

Maltose syrups are of importance for the production of many sweets and baking goods, resp. These starch hydrolysates show reduced browning capacity, retarded crystallization phenomena, and are less sweet, less viscous and less hygroscopic in comparison with syrups of higher glucose content. Enzymatic preparation of such products with regard to the influence of substrate and enzyme concn. reaction time and added calcium on maltose formation -alpha-amylase or barley-$beta$-amylase was investigated. For increasing the maltose content pullulanase as a debranching enzyme was applied. Commercial maltodextrin was used as substrate. The maltogenic enzymes showed different substrate tolerances. High amounts of enzyme did not lead to the expected high amounts of maltose. On the other hand, low enzyme concn. could not be compensated by extended reaction times. Different substrate tolerances also appeared when mixtures of maltogenic and debranching enzymes came into use. AS

Massecuites

1241 Lande (DS). Different massecuite boiling schemes and exhaustibility of molasses. **Indian Sugar** 36(12); 1987; 605-612

Exhaustibility of molasses which is a problem of marked importance to sugar factories particularly in regions where the juice purities are high (86-87%) and 'A' massecuite purities are 90-91% and above has been discussed. With juice purities are 78-80% 3 massecuite boiling schedule is being practiced and 100% sugar of small size is being obtained. With higher massecuite purities, the solid load is more and production of medium and large sugar in the range of 40-50% is being produced. To obtain 100% sugar production, 4 massecuite schedule has been advocated and explained. MVG

Molasses

1242 Lasztity (R), El Shafei (M) and Abd El Samei (M). Biochemical studies on some non conventional sources of protein. Part 3. The molasse **Nahrung** 30(6); 1986; 629-632

Among the high carbohydrate content the cane molasses contains considerable amount of nitrogen compounds including proteins and amino acids. Protein hydrolyzates showed the presence of 16 amino acids with aspartic and glutamic acids and alanine as the major acids in both states bound and free, and there were two unidentified N-containing free acids. Fe, Zn, Mn and Cu were predominant microminerals, K and P were found to be present and in smaller quantities Na. AS

BAKERY PRODUCTS

Cakes

1243 Stinson (CT). A quality comparison of devil's food and yellow cakes baked in a microwave-convention versus a conventional oven. **Journal of Food Science** 51(6); 1986; 1578-1579

The results of this study indicated that high quality cakes could be baked 15-25% faster in a microwave/convection oven than in a conventional oven. OES

1244 Stinson (CT). Effects of microwave convection baking and pan characteristics on cake quality. **Journal of Food Science** 51(6); 1986; 1580-1582

The quality of devil's food cake baked in a microwave/convection oven using different oven conditions and pan characteristics was assessed by sensory and objective methods. The most important factors were the number of layers baked at a given time and the baking pan characteristics, followed by initial oven temp. Crust colour, moistness and cake symmetry were affected by these conditions. For example, single layers received a lower sensory score and had sticky and less red crusts than double layers. Cakes baked in glass-polyester microwave pans were peaked, whereas those baked in aluminium pans were flat. Although slight differences in quality were found by both sensory and objective evaluations, all cakes were acceptable. AS

Tortillas

1245 Herrera (M), Zyman (J), Pena (JG), Segurajauregui JS) and Vernon (J). Kinetic studies on the alkaline treatment of corn (**Zea mays**) for tortilla preparation. **Journal of Food Science** 51(6); 1986; 1486-1490

MILK AND DAIRY PRODUCTS

1246 Parada (JL) and Pamies de Giacchi (M). Resistance of **Streoptococcus lactis** mutants to Beta-lactam antibiotics. **Journal of Dairy Science** 69(8); 1986; 2031-2037

1247 Zadow (JG). Lactose hydrolysed dairy products **Food Technology in Australia** 38(11); 1986; 460-462, 471

Aspects of lactose malabsorption are considered, together with an outline of technique available for hydrolysis of dairy products. A process based on an immobilised enzyme system and developed by a Japanese-Australian consortium is discussed. KAR

Milk

1248 Bassette (R), Fung (DYC) and Mantha (VR). Off-flavours in milk. **CRC Critical Reviews in Food Science and Nutrition** 24(1); 1986; 53-89

This review reports on off-flavours encountered in milk. Aspects includes: transmitted flavours; microbial flavours; lipolyzed flavour; flavours associated with heat treatment; light-activated flavours; oxidized flavours; miscellaneous flavours and UHT milk. BV

1249 Douillard (R). A kinetic model for protease-induced milk clotting and curdling. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 202-207 (Fr).

1250 Hubbie (IB) and Mein (GA). Effect of pre-milking udder preparation of dairy cows on milk quality **Australian Journal of Dairy Technology** 41(2/3); 1986; 66-70

Three pre-milking methods of udder preparation; washing all cows (WAC), washing all cows and drying with a paper towel, (WAD) and washing only dirty tests (WDT) were compared on 36 dairy farms over two 60-day periods. Milk of excellent quality as determined by total bacterial count, coliform count and sediment level was produced with all three methods in both periods. KAR

1251 Karman (AH) and van Boekel (MAJS). Evaluation of the Kjeldahl factor for conversion of the nitrogen content of milk and milk products to protein content. **Netherlands Milk and Dairy Journal** 40(4); 1986; 315-336

The Kjeldahl factor for milk proteins according to the authors should be 6.34 rather than 6.38. The factor for casein was calculated as 6.34, for paracasein as 6.29, for rennet whey proteins as 6.45 and for acid whey proteins as 6.30. The factor for NPN components was estimated to be 3.60. KAR

1252 Koops (J), Klomp (H) and Westerbeck (D). Spectrophotometric and flame atomic absorption spectrometric determination of zinc in milk and milk products Comparison of methods. **Netherlands Milk and Dairy Journal** 40(4); 1986; 337-350

In the present paper details are given of a spectrophotometric (SP) and an atomic absorption spectrometric (AAS) method of determining zinc in milk and milk products. The SP procedure is relatively simple a one-flask method is used with acid digestion, and with dithizone as the reagent. The AAS method involves determination of zinc in dissolved ashed samples which are aspirated into an acetylene air flame. Values obtained with SP and AAS did not differ statistically. AAS is convenient and rapid, but less precise than SP. Both methods give accurate results, as appears from the analysis of two reference materials certified for zinc. AS

1253 Lau (BLT), Kakuda (Y) and Arnott (DR). Effect of milk fat on the stability of vitamin A in ultra-high temperature milk. **Journal of Dairy Science** 69(8); 1986; 2052-2059

The stability of vitamin A in ultra-high temp. milks with 0.15, 2.92, 6.16, and 9.7% fat during storage at 26 C was studied over 3 wk. Milks were fortified with synthetic retinyl palmitate to a final concn. of approx. 120 µg retinol equivalent/100 ml milk. The four milk samples were ultra-high temp. processed and packaged in 100 ml sterile milk dilution bottles and stored in the dark at 26 C for 3 wk. Vitamin A concn. decreased rapidly during the first 2 wk of storage then stabilized. Degradation rates during the first 2 wk were linear and varied inversely with the fat content in the milk (the more fat, the slower the rate of degradation). Final vitamin A concn. at the end of 3 wk of storage were higher in milk with high fat and closely corresponded to the native vitamin A concn. present in milk prior to fortification. The results indicate a possible protective effect due to fat or a difference in stability between native and synthetic vitamin A. AS

1254 McCarthy (DA), Kakuda (Y) and Arnott (DR). Vitamin A stability in ultra-high temperature processed milk. **Journal of Dairy Science** 69(8); 1986; 2045-2051

Stability of vitamin A in partly skimmed (2% fat) fortified and unfortified ultra-high temp. processed milk was examined over 15 wk. Milk samples (stored at 23 ± 2 C) were analyzed weekly for retinyl palmitate and dissolved oxygen. Significant losses of 71 and 73% were observed in replicate samples of fortified milk containing initial vitamin A of 119 and 91 µg retinyl palmitate/100 ml, respectively. An unfortified milk sample with initial vitamin A of 86 µg retinyl palmitate/100 ml showed a loss of 62% whereas the replicate sample with initial vitamin A of 28 µg retinyl palmitate/100 ml remained unchanged during storage. Dissolved oxygen in all four milk samples underwent significant changes. During the first 7 wk, oxygen declined or remained constant. After 7 wk, oxygen in all samples steadily increased. AS

1255 Mitchell (GE). Studies on the freezing point of milk produced in south-east Queensland. **Australian Journal of Dairy Technology** 41(2/3); 1986; 57-62

Freezing point of milk was found to be influenced by the season, time of milking, breed, stage of lactation, interval between milkings, level of nutrition, region and cold storage. Strong correlation was found between freezing point of milk and solids-not-fat minus protein conc. KAR

1256 Oz (HH), Farnsworth (RJ) and Cox (HU). Growth of gram-positive mastogenic bacteria in normal simulated bulk tank, and mastitic milk held at simulated fluctuating temperatures of farm bulk tank. **Journal of Dairy Science** 69(8); 1986; 2060-2065

1257 Serralheiro (ML) and Quinta (ML). Thin layer chromatographic confirmation of aflatoxin M1 extracted from milk. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 886-888

A procedure to directly confirm aflatoxin M1 on a thin layer plate by reaching the toxin with a mixture of reagents containing p-anisaldehyde is described. MVG

1258 Stubblefield (RD) and Kwolek (WF). Rapid liquid chromatographic determination of aflatoxins M1 and M2 in artificially contaminated fluid milks. Collaborative study. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 880-885

1259 Van Egmond (HP) and Paulsch (WE). Mycotoxins in milk and milk products. **Netherlands Milk and Dairy Journal** 40(2/3); 1986; 175-188

Contamination of milk and milk products by aflatoxin M1 and cheese by sterigmatocystin is expected in the dairy and the most fundamental way to tackle the problem is to prevent fungal growth on the dairy product or in the case of carry over of mycotoxins, in the crop, before, during and after harvest, KAR

1260 Zakaria (CR). Determination of degree of lactose hydrolysis in milk by an enzymic cryoscopic method. **ASEAN Food Journal** 2(2); 1986; 74-75

The degree of lactose hydrolyses in milk was determined using a commercial enzyme, by cryoscopic method. The data showed a linear relationship between enzymic activity and degree of hydrolysis. About 132 and 180 lactose unit (LAU) of enzyme per 100 ml of milk brought about 50% and 60% hydrolyses resp. at 40 C after 4 h. Even at a higher concn. of enzyme (375 LAU) only about 80% of the lactose was hydrolysed. OES

Casein

1261 Pinaki Bandyopadhyay, Das (H), Sharma (GP). Moisture adsorption characteristics of casein, lactose, skim milk and chhana powder. **Journal of Food Science and Technology, India** 24(1); 1987; 6-11

Water activity and equilibrium moisture content data of casein, lactose, skim milk and chhana powder at a constant temp. of 50 C were obtained from an apparatus designed for the purpose which has been diagramatically represented. The data were analysed for the detn. of the values of bound water, water activity for the max. stability, moisture content at the change over points in the nature of moisture binding and the energy required for the removal of bound water in these materials. BET, Caurie, 'stability' and 'local' isotherm models were used for analysing the data. The analysis showed that the range of water activities at which the major moisture related changes would take place in the materials are: casein 0.08 to 0.56, lactose 0.20 to 0.73, skim milk 0.12 to 0.72 and chhana powder 0.06 to 0.60. The corresponding moisture contents (in kg water/kg dry solid) of these materials are: casein 0.049 to 0.112, lactose 0.020 to 0.092, skim milk 0.024 to 0.102 and chhana powder 0.019 to 0.086. AS

Milk products

1262 Habraken (CJM), Mossel (DAA) and Van den Reek (S). Management of **Salmonella** risks in the production of powdered milk products. **Netherlands Milk and Dairy Journal** 40(2/3); 1986; 99-116

Monitoring of the environment and the impact of results obtained in daily practice as elaborated by DMV Campina are described. The only washable solution ultimately found satisfactory by the authors relies on (1) continuous systematic drawing of one 2.5g - sample per any 75 kg, (ii) examining 750 g/consignment of 20 tons for **Salmonella** and (iii) check for Enterobacteriaceae in 15 samples of 1 g each per 20 tons. Absolute consumer protection could be achieved only by terminal heat treatment of the reconstituted product linked to measures of hygiene and control of temp. abuse of the ultimate liquid food. KAR

Cheese

1263 Fernandez (A) and Kosikowski (FV). Low moisture Mozzarella cheese from whole milk retentates of ultrafiltration. **Journal of Dairy Science** 69(8); 1986; 2011-2017

Whole milk retentates, prepared by ultrafiltration of pasteurized milk to volume concn ratios of 1.5:1, 1.75:1 and 2:1, were made into low moisture Mozzarella cheese using thermophilic bacterial cultures. Good melting properties, increased output per vat. and higher yield efficiency based on total solids were observed in retentate over control cheese. Optimum retentate volume concn. ratio was 1.75:1. Cheese from 2:1 volume concn. ratio retentates had desirable qualities but were firmer with greater whey fat losses than cheese from non-retentate controls or 1.5:1, and 1.75:1 volume concn. ratio retentates. Composition of cheese made from whole milk retentates using thermophilic starters complied with US federal standards of identity for low moisture Mozzarella cheese. AS

1264 Glattli (H). Thermophilic lactic acid bacteria cultures for cheese making in Switzerland. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(1/2); 1986; 1-4 (De).

1265 Igoshi (K), Kaminogawa (S) and Yamauchi (K). Profiles of proteinases of Gouda-type cheese. **Journal of Dairy Science** 69(8); 1986; 2018-2026

The effect of the pH of the buffer used for extracting proteinases of Gouda type cheese was studied. The results showed that proteinases with different pH optima could be extracted from cheese by using buffers (pH 3.0 to 7.0). Therefore, the proteinases in each fraction chromatographically extracted with buffers of pH 3.0, 4.0 and 6.0 and their properties investigated. There were atleast four proteinases, two of them being serine proteinases and the other two acid proteinases. MVG

1266 Jha (YK) and Singh (S). Use of microbial enzymes in buffalo cheese making. **Indian Dairyman** 38(5); 1986; 247-248

Three commercially available fungal enzymes - MARZYME, NOURY, and MODILASE - were used for making cheese from buffalo milk. They all produced an acceptable cheese, after six months of ripening at 8 ± 1 C. The best product was obtained with MODILASE. KMD

1267 Juarez (M) and Alonso (L). Mineral elements in the manufacturing process of Cabrales cheese. **Revista de Agroquimica y Tecnologia de Alimentos** 26(1); 1986; 123-129 (Es).

Main and trace mineral element contents (Na, K, Ca, Mg, P, Fe, Cu, Zn and Mn) during the Cabrales cheese coagulation and ripening processes were studied. The results indicate that, except for Na, K and Mg, over 45% of the minerals studied were retained in the ripened cheese. The percentage of Ca (51.2) and P (46.1) retained in Cabrales cheese was lower than in other types of cheese, such as Manchego cheese, as a result of more rapid acidification caused by lactic fermentation during coagulation, which favours the solubilization of minerals. AS

1268 Kanawjia (SK) and Singh (S). Quick cheese production by utilization of ripening agents. **Indian Dairyman** 38(6); 1986; 271-274

The authors have discussed various approaches to acceleration of cheese ripening including use of exogenous enzymes; utilization of micro-organisms; utilization of cheese slurries; and incorporation of flavouring compounds. KMD

1269 Kanawjia (SK) and Singh (S). Enhance cheese ripening process by manipulating the manufacturing and curing conditions. **Indian Dairyman** 38(10); 1986; 487-490

The article is a brief review of various attempts made to accelerate the ripening of cheese. It covers aspects like moisture level control; homogenization; and control of curing condition. KMD

1270 Nunez (M), Gaya (P), Medina (M), Rodriguez-Marin (MA) and Garcia-Aser (C). Changes in microbiological, chemical, rheological and sensory characteristics during ripening of vacuum packaged Manchego cheese. **Journal of Food Science** 51(6); 1986; 1451-1455

The effects of cheese age when packaged and of packaging material permeability on Manchego cheese characteristics were studied throughout a 6-month ripening period. Cheese age when packaged had no significant effect on microbial levels, proteolysis, lipolysis or flavour. However, moisture content and rheological characteristics were significantly different from cheeses packaged 1, 2 or 3 wk after salting. Packaging material had no influence on microbiological, chemical, rheological or sensory characteristics of Manchego cheese. Packaged cheese had a lower flavour intensity than nonpackaged cheese, but no significant differences in flavour quality between packaged and nonpackaged cheeses were recorded. Wt losses after 6 months were undetectable in packaged cheese, but they averaged 15.16% in non-packaged cheese. AS

1271 Severn (DJ), Johnson (ME) and Olson (NF). Determination of lactic acid in cheddar cheese and calcium lactate crystals. **Journal of Dairy Science** 69(8); 1986; 2027-2030

An accurate method for the quantification of L(+)-lactic acid and D(-)-lactic acid in cheese and calcium lactate crystals found on the surface of cheese was devised through the modification of an existing L(+)-lactic acid test procedure. The mean percentage of lactic acid recovered from standard solutions was 97.7 for L(+)-lactic acid and 99.5 for D(-)-lactic acid. When known amounts of L(+)- or D(-)-lactic acid were added to calcium lactate crystals and Cheddar cheese, a high percentage of the added lactic acid was recovered, indicating that no racemization of lactic acid occurred during the assay procedure. AS

1272 Upadhyay (KG), Patel (GC), Vaghela (MN) and Ravi Sunder (M). Manufacture of Mozzarella cheese from buffalo milk. **Indian Dairyman** 38(10); 1986; 479-483, 486

Mozzarella is a white, soft, "spun-curd", unripened Italian cheese var. of the pasta-filata family. It has a moist, soft and elastic texture, and has the typical structure of a pulled curd cheese without any gas holes. In its natural state, it may be used either as a table cheese, or as a layering in pizza pies, and in many other Italian dishes. It was originally made from buffalo milk, even in Italy. The authors have described along with flow diagram two standardized techniques for the manufacture of Mozzarella cheese: viz. the starter culture technique and the direct acidification technique ranged from 15.13 to 19.20% (av.: 17.11%) and 13.68 to 19.17% (average 16.76%) resp. They have also reported the chemical composition, baking property, and uses of the cheese. The cheese made by acidification technique showed less stability on storage at 8 ± 1 C. KMD

1273 Yuryev (VP), Braudo (EE) and Tolstoguzov (VB). On determination of the emulsifying activity of proteins. **Nahrung** 30(6); 1986; 585-589

The concept of invariant emulsifying activity of protein was introduced. This characteristic depends only on the composition of the system and the temp. and may serve as a comparable index for various proteins. A study was made of the dependence of the emulsifying activity of dried cheese whey on the rate of oil supply and on the mixing rate. Conditions of detn. of invariant emulsifying activity of dried cheese whey were determined: the rate of oil supply: 0.1-0.2 g min^{-1}, the rate of mixing: 3000-3500 $r.min^{-1}$. With the increase of the whey concn. the multiphase emulsions are formed along with the O/W emulsions. Limitations of the method for detn. of the invariant emulsifying activity are discussed. It has been suggested that conditions of the emulsifying activity estimation should be determined by parameters of specific technological process. AS

Chhana

1274 Sen (DC) and Rajorhia (GS). Potential application of calcium lactate as chhana coagulant. **Indian Dairyman** 38(10); 1986; 475-477

"Chhana" is heat-coagulated, whole milk product obtained by addition of sour whey, or citric acid or lactic acid, or lemon juice, to pre-boiled hot milk, followed by draining of the whey. It is used mainly as the base for the preparation of various sweetmeats such as "sandesh", "rasogolla", "cham-cham", "pantooa", etc. In West Bengal it is now a fairly common practice to use calcium lactate as a coagulant in the preparation of "Chhanna". The authors have examined the application of this compound for such a purpose, and reported its effects on milk coagulation, "chhana" composition and yield, and the advantages and limitations of the use of calcium lactate for such a purpose. KMD

Gulabjamun

1275 Ghosh (BC), Rajorhia (GS) and Dharam Pal. Complete gulabjamun mix. **Indian Dairyman** 38(6); 1986; 279-282

"Gulabjamun", a popular Indian sweetmeat, is traditionally made with a mixture of khoa (or milk solids, 75 g), maida (or refined wheat flour, 25 g) and baking powder (0.5 g). The traditional method of preparation cannot be adopted for large-scale production. The authors have worked out a method of manufacturing gulabjamun mix starting from skim milk powder or roller-dried whole milk powder. The packaging and storage of gulabjamun as well as their desired sensory qualities have also been described. KMD

Ice cream

1276 Addesso (KM) and Kleyn (DH). Development of an acceptable "Ice cream' possessing a reduced sodium content. **Journal of Food Science** 51(6); 1986; 1467-1470

Acceptable "ice cream" products possessing reduced sodium content were developed. Demineralized whey and demineralized whey protein conc. were used individually and in various combinations to replace 15, 25, 75 and 100% of the serum solids contributed by nonfat dry milk. Max. reduction (63%) in sodium was achieved in one product containing 30.5 mg sodium/100g based upon comparison to a control containing 81.5 mg/100g. A descriptive product rating test was used to evaluate experiment products for appearance, flavour, body, texture and acceptability. A student panel found all whey-containing experimental products to be acceptable when compared to the control sample, a high quality vanilla ice cream containing nonfat dry milk solids as the only source of serum solids. AS

1277 Wittinger (SA) and Smith (DE). Effect of sweeteners and stabilizers on selected sensory attributes and shelf life of ice cream. **Journal of Food Science** 51(6); 1986; 1463-1466, 1470

Guar and locust bean gums were combined with sucrose, 36 DE corn syrup and/or 42 high fructose corn syrup in a min fat ice cream formulation. A total of 27 combinations was evaluated for sweetness, iciness, chewiness and vanilla intensity. The results were discussed in detail. OES

Peda

1278 Patel (MM). A study in **Penda** manufacture. **Indian Dairyman** 38(5); 1986; 253-257

Penda or **Dudh peda** is a popular Indian sweetmeat made from **khoa** (conc. milk paste with 85% milk solids and 15% moisture) and sugar. The author has used an oil-cum-compressed air furnace of an improved type for the manufacture of this sweet on a semi-industrial scale (168 kg in one 8-h shift). Details of manufacture, sensory qualities, and chemical composition have been reported. KMD

Yoghurt

1279 Parnell-Clunies (EM), Kakuda (Y) and Deman (JM). Influence of heat treatment of milk on the flow properties of yoghurt. **Journal of Food Science** 51(6); 1986; 1459-1462

Milk was processed by vat heating (VAT, 85 C for 10 to 40 min), high temp. short time heating (HTST, 98 C for 0.5 to 1.87 min) and ultra-high temperature heating (UHT, 140 C) for 2 to 8 sec) and made into yoghurt. Apparent viscosity(shear rate 57.75 s^{-1}) ranged from 550-568 mPa.sec. for VAT treatments. 260-462 mPa.sec for HTST treatments and 170-333 mPa.s for UHT treatments. Flow behaviour indices for all treatments were between 0.55 to 0.65 while consistency index values ranged from 0.3 to 1. Milk processd by HTST systems appeared to be viable alternatives to vat processing. UHT processed milk, however, yielded yoghurts of low viscosity. AS

Milk proteins

1280 Yadav (PL), Sanyal (MK) and Dubey (PC). A technique for manufacture of edible casein. **Indian Dairyman** 38(5); 1986; 249-252

The technique consists of quick coagulation of skimmed milk by acidic whey, incubation of the coagulated skimmed milk for nearly 2 h, cooking, washing, and drying at 55-60 C. The dried casein is then ground to a flour. The final product conforms to Indian Standards Specification NO. 1167-1965. KMD

1281 Zhuravskaya (NA), Kiknadze (EV), Antonov (YuA) and Tolstoguzov (VB). Concentration of proteins as a result of the phase separation of water-protein-polysaccharide systems. Part 1. Phase equilibria in water-milk proteins-polysaccharide systems. **Nahrung** 30(6); 1986; 591-599

A thermodynamic compatibility of skimmed milk proteins and polysaccharides (high-methylated apple pectin, gum arabic and arabinogalactan) with various mol. characteristics in aqueous media has been studied. At a certain composition and pH values all the systems studied can be two-phase, one of the phases representing a concentrated solution or a gel of skimmed milk proteins. The lowest compatibility is exhibited by the water-skimmed milk proteins-polysaccharide systems and the highest one by the water-skimmed milk proteins-arabinogalactan systems. Bodies of separation of the water-skimmed milk proteins-polysaccharide systems in the composition-pH coordinates have been obtained and discussed. AS

1282 Zhuravskaya (NA), Kiknadze (EV), Antonov (YuA) and Tolstoguzov (VB). Concentration of proteins as a result of the phase separation of water-protein-polysaccharide systems. Part 2. Concentration of milk proteins. **Nahrung** 30(6); 1986; 601-613

The process of concn. of skimmed milk proteins as a result of the phase separation of the water-skimmed milk proteins-polysaccharide systems has been studied. This concn. process can be defined as a membraneless osmosis. The rate of the process was studied and the time of the establishment of equilibrium in the two-phase systems obtained by mixing and laying-up the solutions was estimated. The greater effectiveness of the membraneless osmosis was shown to be mainly ensured by a fairly large size of the interphase surface of the systems under study. AS

Skim-milk

1283 Gaylord (AM), Warthesen (JJ) and Smith (DE). Effect of fluorescent light on the isomerization of retinyl palmitate in skim milk. **Journal of Food Science** 51(6); 1986; 1456-1458

Skim milk fortified with retinyl palmitate was exposed to fluorescent light and analyzed for the isomers of retinyl palmitate. High performance liquid chromatography was used to separate and identify the all-**trans** and some **cis** forms.Besides all-**trans** retinyl palmitate, small amounts of 13-**cis** retinyl palmitate were present in unexposed skim milk. The level of all-**trans** decreased over the 48 h period of light exposure. The 13-**cis** levels also decreased but not as rapidly. The level of the 9-**cis** isomer increased over the 48 h period of light exposure. AS

1284 Zahar (M), Smith (DE) and Warthesen (JJ). Effect of carrier type and amount on vitamin A light degradation in foritified low-fat and skim milks. **Journal of Dairy Science** 69(8); 1986; 2038-2044

Effects of type and amount of retinyl palmitate carrier on light stability of all-**trans** retinyl palmitate in fortified low-fat milks were investigated. Skim and 2% fat milks were fortified with retinyl palmitate using butter, coconut, corn, or peanut oil as the vitamin carrier. After pasteurization and homogenization, fortified milk samples were exposed to light in glass tubes. At regular intervals, samples were removed from light and analyzed for all-**trans** retinyl palmitate using high performance liquid chromatography. Less light-induced loss of all-**trans** retinyl palmitate occurred in skim and 2%

fat milks fortified using butter or coconut oil than those using corn or peanut oil. Amount of coconut or corn oil used to incorporate retinyl palmitate also played a role in its light induced degradation rate. At a carrier concn. of 0.001% (vol/vol) in skim milk, light degradation of all-trans retinyl palmitate proceeded approx. twice as fast as 0.01 or 0.1% (vol/vol). Addition of Tween 80 as an emulsifier had negligible effect on retinyl palmitate light degradation in fortified skim milk. AS

MEAT AND POULTRY

Meat

1285 Mittal (GS) and Usborne (WR). Meat emulsion functionality related to fat-protein ratio and selected dairy and cereal products. **Meat Science** 18(1); 1986; 1-21

The influence of fat-protein ratio, moisture content, buttermilk powder, modified wheat flour, corn starch and modified waxy maize flour in processed meat emulsions upon their sensory attributes, textural profile parameters, and selected functional properties were investigated. These properties were optimized using regression models, canonical analysis, response surface methodology, and a multidimensional optimization algorithm. AS

1286 Wilding (P), Hedges (N) and Lillford (PJ). Salt-induced swelling of meat. The effect of storage time, pH, ion-type and concentration. **Meat Science** 18(1); 1986; 55-75

The effect of hypertonic salt solutions on meat fibres has been studied as a function of post-mortem storage. Rabbit **longissimus dorsi** fibres (after about 20 h post-mortem storage at 4 C), were found to swell in hypertonic salt solutions, such as 0.25M KI or 0.6M KCl, to two to three times their original diameter. This swelling occurred in the fibre transverse plane only. X-ray diffraction shows swelling occurs by a combination of an increase in the myofilament lattice spacing and a loss of myofilament order. Fibre swelling is highly co-operative. At pHs below the isoelectric point of the myofibrillar proteins, hypertonic salt solutions induce fibre shrinkage. The post-mortem time course of response shows a peak at 18-35 h bounded by periods of minimal or zero response.; We propose that the collagenous endomysial sheath acts as a restraint to myofibril swelling and that the characteristics of post-mortem swelling are a balance of the myofibrillar propensity to swell and the constraint of the endomysium. AS

Beef

1287 Gill (CO) and Penney (N). Packaging conditions for extended storage of chilled dark, firm, dry beef. **Meat Science** 18(1); 1986; 41-53

1288 Johnson (DD), Weiffenbach (ST) and West (RL). Tenderness and retail display characteristics of beef tenderloin steaks comparing kidney fat removal times under different processing and storage systems. **Journal of Food Science** 51(6); 1986; 1411-1415

Electrical stimulation increased the overall desirability scores on days 2 through 4 of retail display of beef tenderloin steak. Higher Warner-Bratzler shear force values, darker muscle colour and higher retail evaluation for overall desirability were observed for steaks removed from sides that had kidney fat and pelvic fat removed before chilling than for steaks from conventionally dressed sides. Vacuum packaged tenderloin steaks stored for 14 days had higher bacterial counts, more uniform lean colour and less visual purge in retail package than the steaks displayed immediately after tenderloin removal. OES

1289 Lee (YB), Sehnert (DJ) and Ashmore (CR). Tenderization of meat with ginger rhizome protease. **Journal of Food Science** 51(6); 1986; 1558-1559

Beef steaks and sliced beef marinated with different levels of crude ginger extract were evaluated for tenderness and structural changes. A significant enhancement in the tenderness was observed with increasing amounts of ginger extract at low levels (0.0, 0.05, 0.1 and 0.2 ml/6.5 cm^2 for the steaks; 0, 0.25, 0.5 and 1 ml/100g for sliced beef). No further improvement was achieved beyond these levels. Tenderization was brought about by ginger protease through the fragmentation of myofibrils by the preferential degradation of thin filaments in the I-bands, as revealed by electron microscopy. OES

1290 Leod (GM) and Ames (JM). Capillary gas chromatography-mass spectrometric analysis of cooked ground beef aroma. **Journal of Food Science** 51(6); 1986; 1427-1434

1291 Miller (MF), Davis (GW), Seideman (SC) and Ramsey (CB). Effects of chloride salts on appearance, palatability and storage traits of flaked and formed beef bullock restructured steaks. **Journal of Food Science** 51(6); 1986; 1424-1426, 1434

Restructured steaks made with 0.5 or 1.0% KCl, 0.5% magnesium chloride and 0.5% calcium chloride were more desirable and darker red in raw colour than blends formulated with 0.5 or 1.0% NaCl. Visual properties of raw steaks containing 0.5 or 1.0% chloride salt were scored higher than the control (no salt added) in 14 of 16 orthogonal contrast mean comparisions. Steaks made with 1.0% calcium chloride or magnesium chloride were rated lower than the control in flavour desirability and overall satisfaction ratings. Control, 0.5 or 1.0% NaCl or 0.5 and 1.0% KCl steaks were not different in juiciness, tenderness, flavour desirability or overall satisfaction ratings. Steaks made with chloride salts were rancid after 70 days frozen storage. Results showed steaks made with KCl were superior to steaks formulated with calcium chloride or magnesium chloride. AS

1292 Miller (MF), Davis (GW), Seifeman (SC), Ramsey (CB) and Rolan (TL). Effects of various phosphates on the palatability, appearance and storage traits of flaked and formed restructured beef steaks. **Journal of Food Science** 51(6); 1986; 1435-1438

The effects of three phosphates (sodium tripolyphosphate (STP), sodium hexametaphosphate (SHMP) and sodium acid pyrophosphate (SAPP) on the chemical, sensory, visual traits and storage life of restructured beef steaks formulated form lean bullocks were discussed in detail. OES

1293 Trout (GR) and Schmidt (GR). Effect of phosphates on the functional properties of restructured beef rolls. The role of pH, ionic strength, and phosphate type. **Journal of Food Science** 51(6); 1986; 1416-1423

The binding ability (cooked yield and tensile strength) of the restructured beef rolls increased linearly with increasing ionic strength and pH until a max. value was reached and then plateaued. Above an ionic strength of 0.15, the polyphosphates (chain length > 1.0) produced synergestic increases in binding ability with increasing ionic strength. The rate of the synergestic effect decreased linearly as the chain length of the polyphosphates increased. OES

1294 Umano (K) and Shibamoto (T). Analysis of headspace volatiles from overheated beef fat. **Journal of Agricultural and Food Chemistry** 35(1);

1987; 14-18

Bovines

1295 Talmant (A), Monin (G), Briand (M), Dadet (M) and Briand (Y). Activities of metabolic and contractile enzymes in 18 bovine muscles. **Meat Science** 18(1); 1986; 23-40

Cattle

1296 Crouse (JD), Calkins (CR) and Seideman (SC). The effects of rate of change in body weight on tissue development and meat qulaity of youthful bulls. **Journal of Animal Science** 63(6); 1986; 1824-1829

1297 Solomon (MB), West (RL) and Hentges (JFJr). Effects of slaughter weight and carcass electrical stimulation on the quality and palatability of beef from young purebred bulls. **Journal of Animal Science** 63(6); 1986; 1838-1844

Mutton

Lamb

1298 Ramadan (AAS). Effect of freezing storage at -20 and cooking methods on some lipid fractions of lamb meat. **Nahrung** 30(6); 1986; 633-637

Freezing storage and cooking methods might affect the lipid fractions of lamb meat. Some fractions of meat lipids are very sensitive to freezing storage and several cooking methods. Among the different fractions of lipids that might be liable to changes during storage and subsequent cooking and in the same time affect meat flavour are: phospholipids and cholesterol together with its esters. Frozen storage of lamb meat is not the best keeping acceptability scores. Moist heat proved to be the best cooking method for palatability characteristics and not the dry heat. AS

1299 Ramadan (AAS). Effect of cooking methods and freezing storage on amino acids constituents of lamb meat. **Nahrung** 30(6); 1986; 639-644

The flavour of cooked meat and the acceptability of frozen meat, especially those of lamb meat, are affected to a great extent by methods of cooking such as boiling or roasting. These methods of cooking degrade meat protein as an activity of proteolytic enzymes during storage. Amino acids contents, especially essential ones, decreased during freezing and storage in both selected muscles (**Longissimus dorsi** muscle and **Biceps femoris** muscle) under investigation. Roasting was favoured as a cooking method compared with boiling methods, as the latter proved lower amounts of essential amino acids. AS

Pork

1300 Koolmees (PA), Bijker (PG), Van Logstetijn (JG) and Tuinstra-Melgers (J). Histometrical and chemical analysis of mechanically deboned pork, poultry and veal. **Journal of Animal Science** 63(6); 1986; 1830-1837

Chemical analysis and histometrical examinations were performed to obtain a comprehensive picture of the tissue composition and quality of mechanically deboned meat (MDM). Fourteen MDM production plants were involved in the investigation; seven produced mechanicallyb deboned (MDF) pork, six produced MD poultry and one produced MD veal. In addition to chemical anlaysis, the size of the bone particles was measured. From all bone types under investigation, backs, ribs and shhoulders of pigs and calves, as well as poultry carcasses, yielded the highest amount of muscle tissue. The connective tissue-to-muscle tissue ratios of MD poultry and pork (except for heads) were more favourable than those for MD veal. Mechanically deboned poultry had ahigher crude protein and lower fat content than MD pork and veal. Generally, press-type machines produced MDM with a higher cartilage content, a lower calcium content and a lower hard bone residue than anger-type machines. However, bone particles found in MDM processed by press-type machines were larger. It was concluded that histometrical analysis, in addition to chemical analysis, provides valuable information about the contribution of connective tissue, muscle tissue, cartilage and bone in the total protein content of MDM. This information is essential in assessing the quality of MDM. AS

Reindeer

1301 Roos (YH). Melting-behaviour, denaturation and freeze-drying of reindeer meat. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 218-221

Meat products

1302 Adams (ML), Sullivan (DM), Smith (RL) and Richter (EF). Evaluation of direct saponification method for detection of cholesterol in meats. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 844-846

A gas chromatographic (GC) method has been developed for detn. of cholesterol in meats. The method involves (a)ethanolic KOH saponification of the sample material, (b) homogeneous-phase toluene extraction of the unsaponifiables, (c) derivatization of cholesterol to its trimethylsilylether, and (d) quantitation by GC-flame ionization detection using 5-alpha-cholestane as internal standard. This direct saponification method is compared with the current AOAC official method for detn. of cholesterol in 20 different meat products. The direct saponification method eliminates the need for initial lipid extraction, thus offering a 30% savings in labour, and requires fewer solvents than the AOAC method. It produced comparable or slightly higher cholesterol results than the AOAC method in all meat samples examined. Precision, determined by assaying a turkey meat sample 16 times over 4 days, was excellent (CV = 1.74%). Av. recovery of cholesterol added to meat samples was 99.8%. AS

1303 Bartholomew (DT) and Osuala (CI). Acceptability of flavour, texture, and appearance in mutton processed meat products made by smoking, curing, spicing, adding starter cultures and modifying fat source. **Journal of Food Science** 51(6); 1986; 1560-1562

Ham

1304 Thiel (LF), Bechtel (PJ), McKeith (FK), Novakofski (J) and Carr (TB). Effect of salt reduction on the yield, breaking force, and sensory characteristics of emulsion-coated chunked and formed ham. **Journal of Food Science** 51(6); 1986; 1439-1441, 1458

Emulsion coated (EC) and conventionally processed (CP) chunked and formed hams were prepared with 0.5, 1.0 and 2% added salt. When compared to CP hams, EC hams had increased cooking yield, breaking force, moisture retention, juiciness and better texture, tenderness and taste panel acceptability. Reducing the salt level, in CP hams from 2% added salt to levels as low as 1% appeared possible when combined with emulsion coating. OES

Poultry

Chickens

1305 Wang (GIJ) and Fung (DYC). Feasibility of using catalase activity as in index of microbial loads on chicken surfaces. **Journal of Food Science** 51(6); 1986; 1442-1444

The catalase meter with the membrane filter system was tested and found suitable to measure catalase activity as an index of microbial loads on cold stored chicken surfaces. OES

Poultry products

Eggs

1306 Gu (J), Matsuda (T) and Nakamura (R). Antigenicity of ovomucoid remaining in boiled shell eggs. **Journal of Food Science** 51(6); 1986; 1448-1450

Antigenicity of egg white proteins which remained in heated shell eggs

Egg powders

1307 Satyanarayana Rao (TS), Murali (HS) and Gopal Rao (KR). Preparation of foam-mat dried and freeze dried whole egg powder (hen's). **Journal of Food Science and Technology, India** 24(1); 1987; 23-26

The desugared egg melange was pasteurized and either foam mat dried (FMD) or freeze dried (FD) to prepare the powder. FMD needs further drying in vacuum shelf drier to reduce the moisture content to 2%. The glucose content of liquid egg ranged from 382 to 396 mg% and the solids content from 24 to 26%. The recovery % in FMD was 91.48 and in FD 94.81. The solubility % of egg powders prepared by FMD and FD was 96.64 and 96.84 resp. The final moisture content of egg powder from FMD was 2.37 and FD was 0.,19%. Protein content in egg powder was slightly higher (51.25%) in FMD than in FD (48.57%). Pasteurization considerably reduced the bacterial load. The total count and coliform increased in whole egg powder compared to the pasteurized egg melange probably due to the unhygienic handling conditions. KAR

Egg whites

1308 Kakalis (LT) and Regenstein (JM). Effect of pH and salts on the solubility of egg white protein. **Journal of Food Science** 51(6); 1986; 1445-1447, 1455

The solubility of freeze dried (FD) and commercial spray dried egg white protein (SD - 1% dispersion) in water as well as in solutions of NaCl and NaI (0.1, 0.3 and 0.5M) and $Na_2P_2PO_7$(0.01, 0.05 and 0.1M) at pH 3, 5, 7 and 9 was studied. Protein solubility generally increased with increasing pH and salt, concn. Both I and $P_2 O_7$ was increased the apparent solubility of FDEW, but had less effect on that of SDEW. Both NaI and $Na_2P_2PO_7$ changed the character of the solvent on a way similar to that of sodium dodecyl sulphate (SDS). OES

SEAFOODS

1309 Sridhar Adiga (B). Individually quick frozen marine products. Technological aspects. A review. **Seafood Export Journal** 18(12); 1986; 29-44

Crustacea

Crabs

1310 Coleman (CK), Al-Bagdadi (FK), Biede (SL) and Hackney (CR). Ultrastructure of fresh, airblast and sodium chloride brine frozen uncooked blue crab muscle. **Journal of Food Science** 51(6); 1986; 1398-1401, 1406

The ultrastructural changes in the blue crab (**Callinectes sapides**) levator muscle, subjected to blast freezing and brine immersion (23% NaCl at 0C) were studied by transmission electron microscopy as compared to unfrozen prerigor muscle. Better preservation of the sarcoplasmic matrix and the myofibrillar components by the rapid brine-freezing method had been shown to be more advantageous in maintaining the structural quality of the muscle than the slow blast freezing. OES

Fish

1311 Chanmugam (P), Boudreau (M) and Hwang (DH). Differences in the ω3 fatty acid contents in pond-reared and wild fish and shellfish. **Journal of Food Science** 51(6); 1986; 1556-1557

This study reported that the lipids of pond reared prawn, catfish and crayfish had higher levels of ω6 fatty acids and lower levels of ω3 fatty acids and ω3/ω6 ratios as compared to their wild counterparts. OES

1312 Gotze (W). Projection of the energy consumption by univariate and bivariate mathematical-statistical methods in the field of fish distribution. **Lebensmittelindustrie** 33(4); 1986; 179-181 (De).

Analysis and projection of the monthly energy consumption in the cold stores of the fish trade can be realized more dependable by mathematical-statistical models. The ARIMA methods, that include univariate as well as bivariate models have rendered as practicably. The author proposes a two-stage, optional model method. AS

1313 Martone (CB), Busconi (L), Folco (EJ), Trucco (RE) and Sanchez (JJ). A simplified myosin preparation from marine fish species. **Journal of Food Science** 51(6); 1986; 1554-1555

A simple and rapid method for the purification of fish myosin with high yield was described. OES

1314 Mohan Rajan (KV). Small scale fisheries. **Seafood Export Journal** 18(12); 1986; 45-52

1315 Parkin (KL) and Hultin (HO). Spectrophotometric evidence for a hemoprotein in fish muscle microsomes. Possible involvement in trimethylamine N-oxide (TAMO) demethylase activity. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 34-41

When fish muscle microsomes were reduced with sodium dithionite, characteristic absorption peaks appeared at 444 nm and very faintly at 560 nm. These peaks could also be generated by the presence of some of the components that are required for catalyzing microsomal enzyme-mediated trimethylamine N-oxide (TMAO) demethylation. Under certain conditions, the absorbance peaks underwent reoxidation in the presence of these cofactor components and TMAO. The reducible moiety was identified as protoheme by virtue of its absorption maxima at 557, 523, and 416 nm following solubilization in acid-acetone and reaction with pyridine, and it is proposed that it be named H-444 due to its unique Soret band. Reaction of the microsomes with CO after reduction with dithionite produced a Soret band shift from 444 to 428. The hemin content of the fish muscle microsomes was 0.76 pmol mg^{-1} protein, some 3 orders of of magnitude less than that observed in hepatic microsomes. This microsomal hemoprotein may possibly be involved in TMAO demethylation. AS

1316 West (SD) and Day (EWJr). Liquid chromatographic determination of fluridone aquatic herbicide and its metabolite in fish and crayfish. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 856-859

A residue method is described for detn. of the aquatic herbicide fluridone (1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1H)-pyridinone) and its metabolite (1-methyl-3-(4-hydroxyphenyl)-5-[3-(trifluoromethyl)phenyl]-4(1H)-pyridinone) in fish and crayfish tissues. Both compounds are extracted from tissues with methanol, and the extracts are subjected to acidic hydrolysis to release conjugated forms of fluridone and the metabolite. Sample extracts are purified by liquid-liquid partitioning and Florisil Sep-Pak column chromatography. Both compounds are separated and measured by reverse phase liquid chromatography with UV detection at 313 nm. In the absence of interfering peaks, the method has a detection limit of approx. 0.04 ppm of either compound. Overall, recoveries av. 96% for fluridone and 78% for the metabolite for all tissue types combined. AS

Flying fish

1317 Taguchi (T), Tanaka (M), Nagashima (Y) and Amano (K). Thermal activation of actomyosin Mg^{2+} ATPases from flying fish and black marlin muscles. **Journal of Food Science** 51(6); 1986; 1407-1410

The effects of heat treatment (25, 30, 35, 37 and 40 C) on actomyosin Mg^{2+} ATPase activity from flying fish and black marlin were studied in order to elusidate their setting characteristics. The setting ability of flying fish had very high values, but that of black marlin was low. Flying fish actomyosin Mg^{2+} ATPase was activated more than three times, by heating at 35 C while that of black marlin was two thirds at 37 C. The heat treatment had no appreciable effect on the activities of acto HMM ATPase and of acto S-1 ATPase of both the fishes. OES

Hake

1318 Owusu-Ansah (YJ) and Hultin (HO). Chemical and physical changes in red hake fillets during frozen storage. **Journal of Food Science** 51(6); 1986; 1402-1406

Mackerels

1319 Jiang (S-T), Tsao (C-Y) and Lee (T-C). Effect of free amino acids on the denaturation of mackerel myofibrillar proteins in vitro during frozen storage at -20 C. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 28-33

Tilapia

1320 Wicker (L), Lanier (TC), Hamann (DD) and Akahane (T). Thermal transitions in myosin-ANS fluorescence and gel rigidity. **Journal of Food Science** 51(6); 1986; 1540-1543, 1562

Molluscs

Clams

1321 Hendzel (MR) and Fallis (BWand De March (BGE). Interlaboratory comparison of analyses for heavy metals in calm tissue. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 863-868

PROTEIN FOODS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Beer

1322 Dick (E), Wiedmann (R), Lempart (K) and Hammes (WP). Rapid assay for microbial infections in beer. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(1/2); 1986; 37-41 (De).

The aim of our work was the detection of trace infections of as little as one microorganism per litre in filtered beer within 48-72 h. For that purpose the detn. of the microbial ATP by bioluminescence and the epifluorescence microscopy were chosen. The latter direct method fulfilled all requirements to be applied in practice. AS

Breweries

1323 Schwarz (K). On the supply of hot water in breweries. **Lebensmittelindustrie** 33(4); 1986; 166-168 (De).

Wines

1324 Casp (A) and Lopez (A). Effect of "Merseguera" must quality on wine composition and acceptation. **Revista de Agroquimica y Tecnologia de Alimentos** 26(1); 1986; 130-138 (Es).

The relationship between the "Merseguera" must quality and the composition and acceptation of the dry white wine obtained were studied using three different must qualities: dripping must (I) and press must (II) from healthy grapes, and dripping must from grapes affected in a 15% by grey mold (III). The defective sanitary condition of III caused in the corresponding wine an increase of volatile acidity, DO 420 nm, polyols and cations (Na and K). The must II showed the highest level of suspended insoluble solids and the greatest total polyphenolic index, giving place to wines with the highest level in Fe, Ca, Mg and polyols. Nevertheless, the level of higher alcohols was similar in wines from II and from III and lower than in wine from I. The acceptation of the wine from I was significant higher (p = 99%) than the acceptation of the other wines. AS

1325 Krieger (S), Frenne (E) and Hammes (WP). Performing malolactic fermentation in wine with Leuconostoc oenos. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(1/2); 1986; 13-18

1326 Radler (F. Wine: Starter cultures and new developments. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(1/2); 1986; 5-12 (De).

1327 Sponholz (WR), Lacher (M) and Dittrich (HH). The formation of alditols by the yeast of wine. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(1/2); 1986; 19-24 (De).

Non-alcoholic beverages

Chufa

1328 Schwartz (M), Gasque (F), Montesinos (M) and Lafuente (B). Spray-drying of "horchata" beverage. Effect of process variables on product quality. **Revista de Agroquimica y Tecnologia de Alimentos** 26(1); 1986; 81-89 (Es).

In order to estabilish adequate working conditions for spray-drying of "horchata" (beverage from the "chufa", tuber of **Cyperus esculentus**, L.), the influence of feed rate, air flow rate and air inlet temp. on the quality parameter of the product was studied. The experiences were carried out with a concentrated "chufa" extract (15 Brix and 29% DM)with no sugar added, by using a Niro pilot plant (Production Minor). In general, those conditions making shorter the residence time in the drying chamber and accelerating the process (high air flow rate and high air inlet temp., until 150 C), resulted in a better quality product. Adequate drying conditions stabilised were: feed rate, 80 ml/min, air flow rate, 450 m^3 /h and air inlet temp. 150 C. AS

Cocoa

1329 Schwan (RF), Vanetti (MCD), Silva (DO), Lopez (A) and De Moraes (CA). Characterization and distribution of aerobic, spore forming bacteria from cacao fermentations in Bahia. **Journal of Food Science** 51(6); 1986; 1583-1584

Coffee

1330 Fuhlmann (R), Sobek (E) and Volkmer (M). Aspects of the manufacture of roasted coffee. **Lebensmittelindustrie** 33(4); 1986; 182-183 (De).

The best results of roasting and such properties of the coffee drink being wanted by the customers can be attained by systematic roasting technology or grade selection. The decrease of the portion of the Robusta grades within the coffee blend reduces the caffeine content. The content of chlorogenic acid and the portion of the bitter and colouring substances can be influenced by change of the roasting parameters (roasting time and degree). AS

Fruit juices

Cranberry juices

1331 Hale (ML), Francis (FJ) and Fagerson (IS). Detection of enocyanin in cranberry juice cocktail by HPLC anthocyanin profile. **Journal of Food Science** 51(6); 1986; 1511-1513

Adulteration of cranberry juice products by enocyanin, a colourant from grapes was detected by comparing HPLC chromatographic profiles of anthocyanins of cranberry and of enocyanin. It was possible by this method to detect a 5% replacement or more of the expected amount of cranberry juice in cranberry juice cocktail by a solution of enocyanin. OES

Elderberry juices

1332 Poll (L) and Lewis (MJ). Volatile components of elderberry juice. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 258-262

The juice of two elderberry varieties (Korsor and Sambu) were examined for volatile components with GC-MS- and sniff analysis. Five odour regions with elderberry or elderflower aromas were found. Two of the regions with flower aroma coincide with phenylacetaldehyde and 2-phenethanol on the chromatogram. Two of the regions with elderberry aroma coincide with esters (methyl n-undercanoate, ethyl-9-decenoate, methyl n-dodecanaoate) damascenone and vanillin. In the fifth elderberry aroma region no identified peaks were found. Other regions of interest were green aromas (hexanal, hexanol and hexenols) and liquorice aromas (no peaks identified). AS

Grape juices

1333 Morris (JR), Sistrunk (WA), Junek (J) and Sims (CA). Effects of fruit maturity, juice storage, and juice extraction temperature on quality of 'Concord' grape juice. **Journal of the American Society for Horticultural Science** 111(5); 1986; 742-746

Mature grapes produced juice with superior sensory quality and better objective colour initially than less-mature grapes, but juice from grapes at both maturities had similar sensory quality after 18 months. The high extraction temp. (99 C) resulted in juice with better colour initially than extraction at 60 C, but juice extracted at 85 C or 99 C resulted in greater browning and loss of total anthocyanins during storage than extraction at 609 C. High storage temp. (35 C) greatly accelerated quality loss. Sensory colour ratings correlated better with a ratio of absorbances at 520/430 nm (r=0.95) and a/b (r=0.92) than other objective colour measurements. AS

1334 Pompei (C), Rossi (M) and Barozzi (E). Rectified concentrated grape must. HPLC analysis of phenolic substances and hydroxymethylfurfural. **Journal of Food Science** 51(6); 1986; 1498-1500

The possibility of using high performance liquid chromatography (HPLC) to determine low mol. wt. phenolics in rectified concentrated. grape musts (RCM) was studied. No quantifiable amount of phenolics were found by HPLC analyses of the phenolic compounds extracted with ethyl acetate from 8 grape musts and their RCMs. However the chromatograms showed a peak corresponding to hydroxymethylfurfural (HMF). By direct analyses of the RCMs, under the same analytical condition, the HMF content of the RCMs was found to range from 26 to 99 mg/kg of the product. OES

Lemon juices

1335 Klavons (JA) and Bennett (RD). Nature of the pectin constitutent of commercial lemon juice cloud. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 159-161

The cloud pectin content of two commercial lemon juice conc. was 4.0 and 4.2% of the original cloud, respectively. The cloud pectin was solubilized, to varying degrees, in 6% citric acid, pH 7.0; in 10 M urea-6% citric acid, pH 2.5; by hydrolysis of the cloud protein with protease; and in 0.1% sodium oxalate, pH 4.5. These solubilities, for the most part, are irreversible. Between half and two-thirds of the cloud pectin appears to be soluble pectin that is physically entrapped within a matrix of could protein. A small amount of the cloud pectin is classified as protopectin. The remainder of the cloud pectin is mainly in the form of calcium pectate. It is highly unlikely that lemon cloud pectin exists as a complex with protein via an electrostatic interaction. AS

Orange juices

1336 Moshonas (MG) and Shaw (PE). Quantitative analysis of orange juice flavour volatiles by direct-injection gas chromatography. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 161-165

A distillate was prepared from fresh Valencia or Temple orange juice that possessed all of the fresh orange aroma of the juice. This distillate was analyzed by direct injection into a capillary gas chromatography column. Of 24 volatile constituents identified, 21 of these were quantitatively measured. Temple orange juice contained lesser quantities of most of these components than did Valencia juice. These values were compared to quantitative estimates of volatile constituents reported earlier in fresh orange juice. The technique can be used to study changes in volatile flavour components due to processing and storage of orange juice products. AS

Passion fruit juices

1337 YU (ZR) and Chiang (BH). Passion fruit juice concentration by ultrafiltration and evaporation. Journal of Food Science 51(6); 1986; 1501-1505

FATS AND OILS

Fats

1338 Arens (M), Kroll (S) and Ostermann (G). Survey by a working party of the DGF, 96th Report. German Standard Methods for investigation of fats, fatty products and related materials, 73th Report: Analysis of fats XXIII. Fette Seifen Anstrichmittel 88(4); 1986; 139-144 (De).

1339 Begemann (O). Experience in the assessment of used frying fats. **Fette Seifen Anstrichmittel** 88(4); 1986; 124-127 (De).

About 1800 frying fats were tested, and the following parameters were measured: acid value; smoke point and smoke point difference; polar fat components; and saponification colour index, along with the initial fat for comparison. Sensory evaluation must also be included as a significant factor. The analytical data obtained by each analytical method have been discussed, in those cases where some objection arose against the frying fat. It was possible to deduce certain judgement thresholds that are adequate in practice. KMD

1340 Boggs (RW). Sucrose polyester (SPE) - A non-caloric fat. **Fette Seifen Anstrichmittel** 88(4); 1986; 154-158

Sucrose polyester contains 5-8 fatty acids esterified to a sucrose mol. These esterified fatty acids dictate the physical properties of the resulting fat, which may range from a solid to a liquid. Sucrose polyester is resistant to lipase activity; hence, it is not absorbable and does not supply any calories to the organism. The article covers the metabolism, physical properties, toxicity, clinical studies, and acceptance (by animals and humans) of SPE. Schemes for chemical synthesis have also been discussed. Extensive toxicological tests have proved that it is safe to use SPE for lowering the cholesterol level, reducing wt. and controlling appetite and diabetes. KMD

1341 Petersson (B). Pulsed NMR method for solid fat content determination in tempering fats. Part II. Cocoa butters and equivalents in blends with milk fat. Fette Seifen Anstrichmittel 88(4); 1986; 128-136

1342 Zeddelmann (H). Further experiences with the recommendations of the DGF in the assessment of used frying and cooking fats **Fette Seifen Anstrichmittel** 86(4); 1986; 121-124 (De).

The existing recommendation, that a frying fat is no longer marketable if the smoke point decrease, compared with fresh fat, is more than 50C needs to be critically reviewed. Other specified limits,m such as 0.7% petroleum-ether-insoluble, oxidized fatty acids, and 27% of polar fatty acids (as determined by column chromatography) have, however, stood the test of time. The estimation of polar fatty acids is preferred because it is simple, rapid, and less prone to error. The

"Fritest' has also become popular in process control and preselection of suspicious fats. KMD

Fatty acids

1343 Mukarram (M), Ahmad (I), Farooqi (JA) and Ahmad (M). Synthesis of long chain substituted 2-imino-4-thiazolidinones and 2,4-triazolidinediones. **Fette Seifen Anstrichmittel** 88(6); 1986; 224-226

Lipids

1344 Aboul-Enein (AM), Abd el Rahim (EA), Youssef (AM) and Afify (AS). The effect of Triton WR-1339 on lipid metabolism in mice. **Fette Seifen Anstrichmittel** 88(6); 1986; 226-231

Sal fats

1345 Bhattacharyya (DK) and Khatoon (S). Effect of processing and additives on the properties of sal fat and sal stearin. **Journal of the Oil Technologists" Association of India** 18(2); 1986; 41-46

Sal fat was degummed at 50 C for 30 min with (i) phosphoric acid (PA) + water, (ii) sulphuric acid (SA) + PA, (iii) PA+SA+water and (iv) citric acid 10% followed by refining at 50-55 C for 15 min and bleaching. Conc. SA along with conc. PA improved the sal fat colour after refining and bleaching; water addition along with acids did not show any benefit. (ii) and (iii) showed higher rise in temp. during solidification compared to (i) or (iv). The colour and thermal properties of refined sal fat are not influenced by the removal of gum before refining and bleaching. Fractionation of sal fat from hexane (3 ml/g fat) (to obtain stearins) improved the solid fat index (SFI) value. Additive like monoglyceride of sal fat and soy lecithin and unsaponfiable matter isolated from crude sal fat on the slip point solidification and solid fat index characteristics of sal stearin was studied. Monoglyceride at 0.5% level did not alter SFI and solidification characteristics but at 1% level decreased the raise in temp. along with SFI. Lecithin addition at 1% level on the wt. of stearin raises the solidification temp. It is concluded that proper purification can improve the thermal properties of sal fat to use it as cocoa butter substitute in confectionery. KMD

Vanaspati

1346 Majumdar (S) and Bhattacharyya (DK). Vanaspati from palmolein and hydrogenated vegetable oil by interesterification process. **Journal of the Oil Technologists" Association of India** 18(2); 1986; 39-41

The study reports about the interesterification of palmolein with hydrogenated liquid oils like soybean and rice bran to prepare hydrogenated oil (vanaspati) that can substitute the conventional hydrogenated fat. Palmoleinand hydrogenated soybean in equal proportion after simple random interesterification give a product with slip point of 37.5 C and the mixture of 70 parts palmolein and 30 parts hydrogenated soybean when randomised result in a product of slip point of 37.8 C. The corresponding slip points for rice bran oil was 36.9 C and 398.2 C resp. Products containing more palmolein show higher dilatation values at 35 C and 40 C. Vanaspathi gave much higher yield values at 10 C (11.0 kg/cm^2) and 15 C (7.1 kg/cm^2), but at 20 C the interesterified fats and vanaspathi have very close yield values to that of interesterified products. It is concluded that interesterified fats could be prepared by raising the palmolein content from 30 to 70% in vanaspathi preparation. KMD

1347 Majumder (S) and Bhattacharyya (DK). Vanaspati and margarine fat base from palm oil and palmstearin by corandomisation with cottonseed oil. Journal of the Oil Technologists" Association of India 18(2); 1986; 37-38

Interesterified products were prepared by combining palm oil and cotton seed oil at 70:30 and 80:20, palmstearin (iodine value 43) and cotton seed oil at 70:30 and palmstearin (iodine value 33) and cotton seedoil at 60:40 ratio. Slip point and dilatation values were determined at 10-40 C. Vanaspati and margarine fat base could be produced by carandomisation of palm oil or palstearin and cottonseed oil. Palmstearin and cottonseed based fats show lower dilatation values than those of the palmand cotton seed based products at low temp. (< 30 C) but higher dilatation values at 30 C and above. Of the interesterified products palmstearin combined with cottonseed gave higher yields; however the interesterified products showed lower yield values than that of vanaspati at 15 and 10 C. The interesterified products prepared are homogeneous and granulated with no phase separation. The results suggest that both palm oil and palmstearin could be corandomised with cottonseed oil to produce vanaspati and margarine fat bases aving no trans fatty acids. KMD

Oils

1348 Ahmad (R), Ahmad (I), Mannan (A), Ahmad (F) and Osman (SM). Studies on minor seed oils XI. **Fette Seifen Anstrichmittel** 88(4); 1986; 147-148 (De).

Chemical screening of seed oils from 6 sp. of different plant families has been carried out by the use of various chromatographic (TLC-GLC) and spectroscopic (UV, IR) techniques. All the seed oils were generally found to contain palmitic, oleic and linoleic acids but the variability in their amounts was encountered in all sp. Three seed oils namely, **Embelia ribes**, **Chenopodium album** and **Alstonia verticillosa**, were strikingly rich in oleic-linoleic content (> 61%). **A. verticillosa** was significantly found comparable with that of groundnut oil with respect to their fatty acid composition, especially to the contents of oleic (∼54%) and linoleic (∼20%) acids. AS

1349 Stage (H). Methods to improve profitability of physical refining plants in consideration of separation behaviour of secondary components. **Fette Seifen Anstrichmittel** 88(6); 1986; 217-223 (De).

Essential oils

Lemon oils

1350 Yokoyama (H), Gold (S), DeBenedict (C) and Carter (B). Bioregulation of essential oils of lemon. Food Technology 40(11); 1986; 111-113

Traces were treated with bioregulators shortly after fruit set at 4-monthly intervals and the total aldehyde content of cold pressed essential oil as also the alcohols of essential oil of lemon were determined. KAR

Orange peel oils

1351 Anandaraman (S) and Reineccius (GA). Stability of encapsulated orange peel oil. Food Technology 40(11); 1986; 88-93

Limonene-1,2-epoxide and carvone concn. may serve as useful chemical indices for the stability of enacpsulated orange peel oil. Maltodextrin with increasing dextrose equivalents offer increased protection to the encapsulated orange oil. Increasing the dextrose equivalent by 10 could result in a 3 to 6 folds enhancement in shelf-life. KAR

1352 Moshonas (MG) and Shaw (PE). Quantities of volatile flavour components in aqueous orange essence and in fresh orange juice. **Food Technology** 40(11); 1986; 100-103

By a recently developed gas chromatography technique quantitation of volatiles from aqueous orange essence, essence oil and peel oil and fresh orange juice have been done. KAR

Palm oils

1353 Asap (T) and Augustin (MA). Effect of TBHQ on quality characteristics of RBD olein during frying. **Journal of the American Oil Chemists" Society** 63(9); 1986; 1169-1172

The changes in the quality characteristics of refined, bleached and deodorized palm olein (RBD olein) during heating with intermitent frying for 5 h/day for 8 consecutive days in 3 systems were compared. The systems were 1. RBD olein without antioxidant 2. RBD olein to which 200 ppm of tertiary butyl hydroquinone (THBQ) had been added prior to frying on the first day and 3. RBD olein which had TBHQ added to a level of 200 ppm at the start of each day. The additon of TBHQ reduced the level of polar components and polymers in the oil, decreased the rates of change in iodine value and dielectric constant and the oil, decreased the rates of change in iodine value and dielectric constant and rate of oxidation of C18:2. These effects were more pronounced when the TBHQ was added to the system on each day of frying than when there was a single addition prior to frying on the first day. The undesirable effect of TBHQ was that it darkened the oil. OES

1354 Edewor (JO). A comparison of treatment methods for palm oil mill effluent (POME) wastes. **Journal of Chemical Technology and Biotechnology** 36(5); 1986; 212-218

This paper reviews and assesses the practical and economic value of the various methods that could be used to recover the gases or fertilizer from POME waste materials. BV

Rapeseed oils

1355 Sukumaran (CR) and Singh (BPN). Oil expression characteristics of rapeseed (**Brassica campestris**) under uniaxial bulk compression. **Journal of Food Science and Technology, India** 24(1); 1987; 11-16

The study was conducted to evaluate oil expression characteristics of rapeseed under different conditions of load application in relation to moisture content and rate of deformation under confined conditions of uniaxial bulk compression. An experimental test cell with concentric cylinder piston system for uniaxial bulk compression in universal testing machine was used which is shown diagramatically with labelled parts. Seed with moisture of 4.56, 6.46, 9.35 and 12.35% (w.b.) and rates of deformation of 5.0, 10.0, 15.0 and 19.5 mm/min and 15 levels of max. compression ranging between 0.94 and 58.99 MN/m^2 were used. Mathematical expression were developed to correlate the effect of these factors on oil expression characteristics. Max. oil recovery of 62.32% was achieved at 4.56% moisture, and 19.5 mm/min rate of deformation and at a total pressure of 58.89 MN/m . At any constant pressure oil recovery increased linearly with increase in rate of deformation. Oil recovery dropped from 39.30 to 29.50% when moisture content was increased from 4.56 to 12.35% with an applied pressure of 29.45 MN/m^2 and 19.5 mm/min rate of deformation. Oil recovery efficiency for any degree of compression was found to be an exponential function of the composite variable P-Po 1+R where, P is total pressure, Po is oil point pressure, and R is rate of deformation. KAR

1356 Zajic (J), Volhejn (E) and Jirousek (A). Dependence of the radial pressures in the screw press on the technological conditions in rapeseed pressing. **Fette Seifen Anstrichmittel** 88(6); 1986; 231-238 (De).

Rice bran oils

1357 Bhattacharyya (AC), Majumdar (S) and Bhattacharyya (DK). Edible quality rice bran oil from high FFA rice bran oil by miscella refining **Journal of the American Oil Chemists" Society** 63(9); 1986; 1189-1191

Rice bran oils high in free fatty acids (FFA) can be converted to cooking oil having low unsaponifiable matter and light colour by a combination of miscella dewaxing and miscella refining. AS

Soybean oils

1358 Taneja (VK), Sharma (NK) and Wagle (RD). Detection and quantitation of linseed oil in soybean oil by HPLC. **Journal of the Oil Technologists" Association of India** 18(2); 1986; 54-55

This method is based on the presence of a triglyceride of Equivalent Carbon Number (ECN) 36 only in linseed oil. Using synthetic blends containing from 1 to 10% linseed oil, a graph was plotted connecting linseed oil % in soybean oil and the peak height of ECN 36. Unknown samples run on HPLC can be read against the graph. KMD

Walnut kernel oils

1359 George (G), Bhat (KK) and Indira ASMurthy (DP). Hypolipidaemic effect of walnut (**Juglans regia**) kernel and its oil in rats. **Fette Seifen Anstrichmittel** 88(6); 1986; 238-243 (De).

Walnut (**Juglans regia**) kernel and its oil were found to reduce serum cholesterol, triglycerides, phospholipids and total lipids in cholesterol bile salt stressed hypercholesterolaemic rats. Kernel was as effective as its oil (unrefined or refined); thus the efficacy of kernel was due to its oil content having about 70% polyunsaturated fatty acids. Both unrefined and refined oils having different contents of unsaponifiable matter and sterols behaved in a similar way indicating that unsaponfiable matter and sterol contents of oil were not responsible for their efficacy. There was no difference in faecal cholesterol in animals given vanaspati, walnut kernel or its oil; thus hypolipidaemic effects observed with walnut kernel or its oil could not be attributed to any differences in faecal cholesterol. Serum SGO-T activity of animals of groups given vanaspati, walnut kernel, walnut oil and safflower oil was similar and normal. The blend of vanaspati and walnut oil (1:1) was as effective as walnut kernel and its oil. The study brings to light special value of walnut kernel as a food material in reducing serum lipid constituents. AS

SPICES AND CONDIMENTS

Spices

1360 Sanna (LA). Distillation method for determination of moisture in spices Collaborative study. **Journal of the Association of Official Analytical Chemists** 69(5); 1986; 834-837

AOAC method 30,005 for detn. of moisture in spices by distillation was collaboratively studied to revalidate its reliability. Using toluene as the solvent system, repeatability and reproducibility were acceptable for basil. Using hexane as the solvent for red pepper produced less satisfactory results. The method has been adopted official first action. AS

Garlic

1361 Kamanna (VS) and Chandrasekhara (N). Lipid composition of garlic. **Fette Seifen Anstrichmittel** 88(4); 1986; 136-139

Neutral, glyco- and phospholipids of garlic were resolved into their component fractions by thin layer chromatography. Neutral lipids contained considerable quantities of monoglycerides (18.5%), diglycerides (14.2%), sterols (16.3%) and triglycerides (41.5%) respectively. The phospholipid fraction was rich in phosphatidyl choline (23.5%), phosphatidyl ethanolamine (17.9%) lysophosphatidyl choline (11.8%) and lysophosphatidyl ethanolamine (8.2%). Digalactosyl diglyceride (10.1%), sterol glycoside (15.6%), cerebrosides (8.1%) acylsterol glycoside (38.6%) and monogalactosyl diglyceride (22.5%) were the major components of the glycolipids of garlic. Lauric, myristic, palmitic and linoleic acids constituted the major fatty acids of monoglycerides, diglycerides and free fatty acid fractions whereas palmitic, linoleic and linolenic acids were the major fatty acids of triglycerides. Palmitic and linoleic acids were the major fatty acids of garlic phospholipids. Except the acylsterol glycoside fraction glycolipids were rich in lauric, palmitic, linoleic acids; plamitic acid was the only major fatty acid of acylsterol glycosides. AS

1362 Lukes (TM). Factors governing the greening of garlic puree. **Journal of Food Science** 51(6); 1986; 1577, 1582

Garlic bulbs stored at or above 23 C for a month before processing did not develop green pigmentation when processed into a puree. The amino acid, S-(1propenyl) cysteine sulphoxide was found responsible for the green colouration. DES

1363 Mohammad (N), Anwar (M), Ehteshamuddin (AFM) and Jamil (M). Moisture sorption studies on garlic powder. **Journal of Food Science** 51(6); 1986; 1575-1576

The moisture sorption isotherms of two samples of garlic powder, one containing corn starch (CS) and the other without starch, were determined using saturated salt solutions. Monolayer values were calculated from the isotherms using the Brunauer, Emmett and Teller (BET) equation. The addition of CS at 5% slightly increased the monolayer value of the garlic powder, but it had little effect on the caking behaviour of the powder. Equilibrium relative humidity(ERH) of garlic powder corresponding to the monolayer value was found to be 14%. AS

Horseradish

1364 Kroyer (G). Interaction of sulphite (sulphur dioxide) with ingredients of horseradish Part 1. The influence of sulphite (sulphur dioxide) on vitamin C, B1, B2, B6 and niacin. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 222-224 (De).

The effect that adding sulphite (sulphur dioxide) to horseradish paste has on the vitamin content was studied. Changes in the sulphur dioxide content and of the main vitamins, C, B1, B2, B6 and niacin, were determined during storage at room temp. (1-4 wk) after addition of sodium bisulphite (300 resp. 2000 ppm sulphur dioxide). In sulphited horseradish paste the content of free sulphur dioxide decreased very rapidly in the first days of storage; vitamin B1 (thiamin) was almost totally destroyed within a few wk, whereas the vitamins B2 and B6 and niacin were retained for a longer period; the levels decreased only after further storage. Higher concn. of sulphite led to faster destruction of the vitamins in all cases. In unsulphited horseradish paste these vitamins showed relatively good stability. In contrast, the destruction of ascorbic acid, which usually takes place rapidly in unsulphited horseradish paste, was significantly decreased and retarded owing to the protective effect of the added sulphite. Longer storage of sulphited horseradish paste led to increased destruction of ascorbic acid as a consequence of the reduction of free sulphur dioxide. AS

1365 Kroyer (G). Interaction of sulphite (sulphur dioxide) with ingredients of horseradish. 2. Interaction with the major flavour components allyl-and 2-phenylethylisothiocyanate. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 226-228 (De).

Paprika

1366 Fisher (C) and Kocis (JA). Separation of paprika pigments by HPLC. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 55-57

The carotenoid pigments in paprika extract were separated by high-performance liquid chromatography (HPLC) without prior saponification and compared with saponified paprika extract. In the general order of elution on the C-18 reversed-phase column, four classes of compounds were recognized; hypophasic xanthophylls, mono fatty acid carotenoid esters, epiphasic carotenoids, and bis fatty acid carotenoid esters. The major hypophasic xanthophylls are capsorubin, violaxanthin, capsanthin, antheraxanthin, and zeaxanthin. The major epiphasic carotenoids are cryptocapsin, cryptoxanthin, and Beta-carotene. The mono and bis fatty acid carotenoid esters reactive to acid treatment (contains epoxy group) and sodium borohydride treatment (contains carbonyl group) were identified. AS

1367 Llorente Franco (S), Gimenez (JL), Martinez Sanchez (F) and Romojaro (F). Effectiveness of ethylene oxide and gamma irradiation on the microbiological population of three type of paprika. **Journal of Food Science** 51(6); 1986; 1571-1572, 1574

The effectivess of ethylene oxide and gamma irradiation treatments on the microbial population of three types of Spanish paprika stored in cold (4 C) and in room temperature (16-36.8 S) was studied over a period of 285 days . Both the sterilising treatments reduced the microbial load below the permissible levels recommended by the International Commission on Microbiological Specification for Food. Of the two treatments gamma irradiation was found to be more effective. OES

SENSORY EVALUATION

1368 Fiszman (SM), Costell (E), Serra (P) and Duran (L). Relaxation in viscoelastic systems. Comparison of methods to analyze experimental curves. **Revista de Agroquimica y Tecnologia de Alimentos** 26(1); 1986; 63-71 (Es).

Information obtained in analysing relaxation curves of agar gels (1,3 and 5%) with four different methods was compared: 1) fit to a generalised Maxwell model with successive residual method; 2) fit to a simple Maxwell model; 3) normalization of relaxation curve and 4) plotting % relaxation versus time. Results obtained shown that method I provides more exact information than method 2. This one, however, is simpler and the data obtained are valid in most cases. Normalization of the relaxation curves does not improve their interpretation and the physical meaning of parameters is not clear. Plotting of relaxation percentage versus time is an easy, fast and suitable method for comparing curves but it cannot be used for rheological characterisation. AS

1369 Huynh-ba (T) and Philippossian (G). Alleged salty taste of L-ornithyltaurine monohydrochloride. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 165-168

Very recently, L-ornithyltaurine hydrochloride (1) was claimed to be salty, with a saltiness equal to that of NaCl. To evaluate its organoleptic properties, peptide 1 was synthesized and rigorously purified: It was found not to be salty. The saltiness claimed earlier probably resulted from NaCl present as an artifact of the method of preparation. AS

1370 Mahony (M) and Goldstein (LR). Effectiveness of sensory difference tests. Sequential sensitivity analysis for liquid food stimuli. **Journal of Food Science** 51(6); 1986; 1550-1553

Versions of the triangle test in which either one or the other stimulus was maintained as the odd one, were found to differ in their effectiveness for a flavoured sparkling water system but not for a wine system. The same was found for different orders of presentation of the R-index sensory difference test. These differences were predicted successfully from the signal detectabilities of the various stimuli using a predictive system called Sequential Sensitivity Analysis (SSA). This extended SSA beyond model systems to food systems. Use was made of a technique of rapid alternate tasting of different stimuli, called 'warm-up', to improve judges' performance. AS

1371 Sadowska (M), Sikorski (ZE), Rudzki (J) and Kapsa (Z). Relation between the rheological properties of collagen dispersions and collagen films. **Lebensmittel-Wissenschaft und-Technologie** 19(3); 1986; 189-192 (De).

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Infestation control

Corcyra cephalonica

1372 Shazali (MEH). The potential rate of increase of **Corcyra cephalonica** Staint) on sorghum. **Insect Science and its Application** 7(5); 1986; 589-591

A laboratory study of the biology of **Corcyra cephalonica** (Staint) was made at 30 C and 70% r.h. on sorghum. The number of eggs laid per female, ovipositon period, development time and survival from egg to adult were determined. The data were used to estimate the finite rate of increase and the intrinsic rate of natural increase of the moth. For thefinite rate of increase (λ) the estimated value was 18 per lunar month, corresponding to an intrinsic rate of natural increase (r) of 2.9. The results are compared with published data and it is concluded that the pest potential of C. **cephalonica** has been, hitherto, underestimated. AS

Cydia pomonella

1373 Burditt (AKJr. Irradiation as a quarantine treatment for walnuts infested with codling moths (Lepidoptera: Tortricidae) **Journal of Eco-**

nomic Entomology 79(6); 1986; 1577-1579

Pesticides

Fumigation

1374 Leesch (JG), Davis (R), Zettler (JL), Sukkestad (DR), Zehner (JM) and Redlinger (LM). Use of perforated tubing to distribute phosphine during the in-transit fumigation of wheat. **Journal of Economic Entomology** 79(6); 1986; 1583-1589

Application of phosphine using slotted tubing (10.16 cm o.d.) to carry the phosphine gas to the bottom and middle of the cargo at the dosage of 1.07 g(Al)/m^3 was found to give full control from infestation. KAR

Insecticides

1375 Peter Kurtz (A) and Durden (JAJr). Quantitative structure-activity relationships in insecticidal oxathiolane and dithiolane oxime carbamates and related compounds. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 115-121

The insecticidal and acaricidal activities and the mammalian toxicity of a series of 28 oxathia and dithia heterocyclic oxime methylcarbamates have been related to certain of their physiochemical properties. Multiple regression studies have shown that fly head acetylcholinesterase inhibition and housfly, buckthorn aphid, two-spotted spider mite, southern armyworm, Mexican bean beetle, and rat toxicities are enhanced by increased steric requirement of ring substituents (Taft E_s). Increasing lipophilicity (Log P) uniformly diminishes activity against the arthoropoids and the rat while the presence of a Beta-sulphur as compared to a Beta-oxygen is associated with increased activity against all test organisms. These correlation studies suggest that further synthesis in this series is unlikely to yeild effective insecticides in which the arthoropod/mammal selectivity is improved over that of compounds already in hand. AS

1376 Peter Kurtz (A), Durden (JAJr), Sousa (AA) and Weiden (MHJ). Novel insecticidal oxathiolane and oxathiane oxime carbamates. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 106-114

A series of 4-[(methylcarbamoyl)oximino]-1,3-oxathiolane and related insecticides has been synthesized. These compounds, monooxygen analogues of recently reported (carbamoyloximino)di-thiolanes and -dithianes, show the same level of insecticidal activity as do the disulphur materials. Replacement of the sulphide link with oxygen, however, reduces both mite and mammalian toxicity relative to the disulphur compounds. AS

BIOCHEMISTRY AND NUTRITION

Biochemistry

Vitamins

1377 Gregory (JFIII) and Ink (SL). Identification and quantification of pyridoxine-Beta-glucoside as a major form of vitamin B6 in plant derived foods. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 76-82

A high-performance liquid chromatographic procedure was adapted to the fluorometric measurement of a glucoside conjugate of vitamin B6 compounds in foods, 5'-O-Beta-D-Glucopyranosylpyridozine was identified by HPLC and NMR methods as the major glycosylated form of the vitamin. This conjugate, which has been shown to exhibit incomplete metabolic utilization as vitamin B6 was found to comprise 5-70% of the total vitamin B6 in selected fruits and vegetables. Pyridoxine-Beta-glucoside was not detected in animal-derived foods including meats, human milk, and cow's milk. AS

Vitamins

1378 Kanner (JD) and Fennema (O). Photooxidation of tryptophan in the presence of riboflavin. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 71-76

Solutions of tryptophan (free and bound in various peptides, with a Trp concn. of 1.0 x 10^{-3} M) containing 2.1 x 10^{-5} M riboflavin were exposed to fluorescent light,and the oxidation products, kynurenine (kyn) and N-formylkynurenine (NFK), were measured by HPLC. In the range pH 4-7.5, kyn and NFK accumuated most rapidly at pH 7.5. With dipeptides (Trp-Gly; Gly-Trp), the rate of Trp oxidation was greatest when Trp was bound on the carboxyl side. Binding of Trp within a tripeptide (Gly-Trp-Gly) resulted in the smallest reaction rate, while Trp bound on the amino side (Gly-Trp) exhibited a reaction rate intermediate between those of Gly-Typ-Gly and Trp-Gly. Of the three antioxidants tested, EDTA was the least effective in retarding oxidation of Trp, and sodium azide and L-ascorbic acid were equally effective. AS

Nutrition

1379 Karossi (TA) and Sutherland (TM). Characterization of pronase digestion rate and products of protein meals. **ASEAN Food Journal** 2(2); 1986; 64-70

The **In vitro** nitrogen digestibility of some common protein meals was studied with prolonged incubation of the meals with pronase. Exclusion chromatography study of the digests indicated that in no case, the pronase digestion converted the protein into the mol. wt. range suitable for intestinal absorption although a large part had been converted to the range below 1000 Daltons. Deproteinisation with picric acid showed no clear cut off and left in solution some oligopeptides larger than 1000 Datlons. The insoluble residues after pronase treatment showed susceptibility to further proteolyses when tested separately with different proteolytic enzymes. OES

TOXICOLOGY

Bacteria

Bacillus thuringiensis

1380 Campbell (DP), Dieball (DE) and Brackett (JM). Rapid HPLC assay for the Beta exotoxin of **Bacillus thuringiensis. Journal of Agricultural and Food Chemistry** 35(1); 1987; 156-158

A high-performance liquid chromatography (HPLC) assay has been developed for Beta-exotoxin in fermentation beers and formulation samples. The assay is rapid and specific, and results correlate well with the fly bioassay. Detector response is linear over a concn. range of 0.0-0.56 mg/mL Beta-exotoxin. The assay is capable of detecting both the phosphorylated and dephosphorylated forms of Beta-exotoxin. AS

Insecticide residues

1381 Jain (PC), Atul Sharma Bhatnagar (KN). Residues of phosphamidon and monocrotophos on coriander. **Journal of Food Science and Technology, India** 24(1); 1987; 49-51

Coriander crop was sprayed with phosphamidon (0.03 and 0.05% emulsion) and monocrotophos (0.04 and 0.06% emulsion) at 500 l/hr on Feb. 14, 1982. Whole plant, leaf and green grain were analysed for the presence of insecticides at 0, 1, 3, 7, 10, 15 and 21 days of application. Phosphamidon residue reached the tolerance limit (0.5 ppm) in 11 and 12 days in whole plant and 10 and 11 days in leaves at 0.03 and 0.5% application resp. Coriander leaves are used for seasoning in Indian cookery to impart flavour. It is concluded that after 12 days of application of the insecticide at both the doses the plant is fit for consumption. Monocrotophos reached the tolerance limit of 0.2 ppm in 14 and 15 days at the lower and higher doses resp. both in whole plant and leaves. At harvest (35 days after application) both the insecticides were below the detectable level. KAR

Mycotoxins

Zearalenone

1382 Dixon (DE), Warner (RL), Ram (BP), Hart (LP) and Pestka (JJ). Hybridoma cell line production of a specific monoclonal antibody to the mycotoxins zearalenone and Beta-zearalenol. **Journal of Agricultural and Food Chemistry** 35(1); 1987; 122-126

FOOD LAWS AND REGULATIONS

Nil

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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm,cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/ pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal,kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg,ml,mm)
m-equiv	milli-equivalent
ᴍ	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-(10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-(as in µg, µm)
%	per centum
>	greater than
⩾	greater than or equal to; not less than
<	less than
⩽	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

GENERAL

1383 Acra (A) and Jurdi (M). Egg flotation method: Its assessment and development into a household technology for the accurate preparation of pickling brine in developing countries. **Food and Nutrition Bulletin** 8(2); 1986; 60-65

1384 Quisumbing (MAR). The effects of food price and income policies on the nutrition of low-income groups: A philippine case-study. **Food and Nutrition Bulletin** 8(2); 1986; 24-49

1385 Wallerstein (MB). The impact of agricultural and food-supply policies on nutrition and health status. **Food and Nutrition Bulletin** 8(2); 1986; 2-3

Reports the results of an effort to explore the possible linkages between agriculture and food-supply policies and the nutrition and health status of vulnerable groups, with the goal of increasing long-term food security. BV

FOOD PROCESSING

1386 Bender (AE). Irradiation and nutrition. **IFST Proceedings** 19(4); 1986; 181 - 184

1387 Gaunt (IF). Food Irradiations - safety aspects. **IFST Proceedings** 19(4); 1986; 171-174

Discusses: safety aspects of irradiation; induced irradiation and toxic effects of radiolytic products. BV

1388 Gould (GW). Food irradiation. Microbiological aspects. **IFST Proceedings** 19(4); 1986; 175-180

Briefly covers effect of ionising radiation on microorganisms; radiation resistance of different microorganisms; combination treatments and safety. BV

1389 Robinson (DS). Irradiation of foods. **IFST Proceedings** 19(4); 1986; 165-168

1390 Wilkinson (V). Food irradiation in practice. **IFST Proceedings** 19(4); 1986; 169-170

Briefly covers irradiation of food and practical applications of food irradiation. BV

FOOD PACKAGING

Nil

FOOD ENGINEERING AND EQUIPMENT

1391 Filkova (I), Lawal (A), Koziskova (B) and Mujumdar (AS). Heat transfer to a power-law fluid in tube flow: Numerical and experimental studies. **Journal of Food Engineering** 6(2); 1987; 143-151

The results of an experimental study of heat transfer to power-law fluids flowing in a cylindrical tube are compared with the results of a numerical simulation programme developed by Lawal and Mujumdar. The experimental studies conducted at the Czech Technical University used CMC solutions and tomato juice as working fluids. The experimental programme and the computational model are briefly described. AS

1392 Morris (CE). Heat exchange technology. **Food Engineering International** 11(9); 1986; 57-61

1393 Olivares (M), Guzman (JA) and Solar (I). Thermal diffusivity of nonhomogeneous food. **Journal of Food Processing and Preservation** 10(1); 1986; 57-67

Thermal diffusivity of nonhomogeneous canned food were evaluated through heat penetration experiments. The values obtained are in the range between 1.5 and 2.0 x 10^{-7} m^{2} 1s which agreed reasonably with previous values reported in the literature. The reliability of applied theoretical model, the heat conduction equation for a finite cylinder, was fairly good. KAR

1394 Schubert (H). Food particle technoloy. Part II. Some specific cases. **Journal of Food Engineering** 6(2); 1987; 83-102

In Part II the flowability of instant powders for vending machines, the recovery and enrichment of protein from food wastes, and the selective comminution of vegetable foods for protein enrichment serve as practical examples. The relevance to each case of the fundamentals reviewed in Part I illuminates connections which remain obscure when empirical methods, still widely used in food technology, are employed. AS

Equipment

Driers

1395 Bell (GA) and Mellor (JD). Development of the adsorption freeze-dryer. **CSIRO Food Research Quarterly** 46(3); 1986; 56-58

Describes briefly the adsorption freeze-dryer developed at CSIRO and its advantages. The new device will cover a wide range of applications in industrial products including foods, biological specimens, flowers and laboratory uses where removal of moisture from labile substance is required. BV

Extrusion cookers

1396 Chouikhi (SM), Ferdinand (JM) and Smith (AC). Use of a microwave-attenuation sensor for moisture measurement inside an extrusion cooker. **Journal of Food Engineering** 6(2); 1987; 113-121

A microwave strip line sensor has been inserted in the barrel of a pilot scale extrusion cooker immediately before the die. Experiments with maize grits have shown that the microwave attenuation is sensitive to the moisture content of the feed. Preliminary experiments with finer particulate feedstock indicate that the microwave attenuation also depends on the distribution of water within the viscous material at this point. A microwave sensor is shown to have potential for probing the material within an extrusion cooker for use in controlling product properties. AS

1397 Roberts (SA) and Guy (RCE). Metastable states in a food extrusion cooker. **Journal of Food Engineering** 6(2); 1987; 103-112

An extrusion cooking process for the manufacture of expanded wheat flour products was found to exhibit two states in which the system could come to equilibrium for the same settings of the independent process variables. Examination of the degree of fill in the sections of the screw and observations of the dependent process variables such as torque, pressures and mass temp. enabled an explanation of the metastable states to be proposed related to moisture movement within the screw system. Certain design features of the screw system are proposed to eliminate this form of instability. AS

Heat exchangers

1398 Harrod (M). Scraped surface heat exchangers: A literature survey of flow patterns, mixing effects, residence time distribution, heat transfer and power requirements. **Journal of Food Process Engineering** 9(1); 1986; 1-62

ENERGY IN FOOD PROCESSING

1399 Bhattacharya (M) and Hanna (MA). Influence of process and product variables on extrusion energy and pressure requirements. **Journal of Food Engineering** 6(2); 1987; 153-163

Energy and pressure requirements for processing foods as affected by product moisture content and extruder barrel temp. and screw speed were studied using corn gluten meal (CGM) processed in a C.W. Brabender laboratory single-screw cooker-extruder. The extruder screw was 1.9 cm in diameter, had a 3:1 compression ratio and a 20:1 barrel length-to-diameter ratio. The die-end nozzle was 3 mm in diameter. Moisture contents were 14, 20 and 26% (dry basis), extruder barrel temp. were 120, 145 and 170 C and the extruder screw speeds were 100, 150 and 200 rpm. Regression analysis showed that moisture content contributed most to the variation in energy requirements (32.4%), followed by temp. (12.4%). Effect of screw speed was found to be insignificant. Increasing moisture content and barrel temp. caused specific energy to decrease. Pressure was found to be significantly affected and decreased with increases in all three variables. AS

1400 Boyles (DT). Biomass for energy. A review. **Journal of Chemical Technology and Biotechnology** 36(11); 1986; 495-511

This review examines biomass resources; biomass upgrading to fuel; biofuel processing cost; energy balances; bioenergy for the developing world; the social impact of biofuels and research. BV

FOOD CHEMISTRY AND ANALYSIS

1401 Mitchell (C). New uses for carbon dioxide. **Food Manufacture** 61(11); 1986; 66-67

This article covers technology and advantages of carbondioxide as an extraction solvent and its applications (flavours; essential oils; oleoresins; natural colours; decaffeination; defatting; deodourisation; vegetable oils and fats). BV

Chemistry (Analytical)

1402 Cilliers (JJL) and Niekerk (PJ). LC determination of phytic acid in food by post column colorimetric detection. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 680-683

A method is described for the high-performance liquid chromatographic (HPLC) detn. of phytic acid (myoinositol 1,2,3,4,5,6-hexakis (dihydrogen phosphate)) in grain sorghum and soybean samples after extraction with 3% trichloroacetic acid (TCA). The only sample preparation necessary after acid extraction was centrifugation at 50000g for 10 min. and filtration. Separation and quantitation were achieved within 5-8 min on an anion-exchange column, IC-PAK-A (0.46 cm i.d. x 5 cm) with 0.045 M sodium nitrate containing 0.018 M nitric acid as mobile phase at a flow rate of 1.2 mL/min. The phytic acid was detected at 500nm by means of an in-line post column reaction (0.015% ferric chloride containing 0.15% 5-sulfosalicylic acid). Inositol mono-, di-, tri-, tetra-, and pentaphosphates can also be detected with this method. AS

1403 Deshpande (SS), Cheryan (M) and Salunkhe (DK). Tannin analysis of food products. **CRC Critical Reviews in Food Science and Nutrition** 24(4); 1986; 401-449

This review covers tannin analysis of different food products chemistry of phenolic compounds; methods of analysis; vanillin assay oxidation-reduction methods; protein precipitation methods; UV spectrophotometry; factors influencing tannin analysis (cereals, millets, legumes) and future research needs in this area. BV

1404 Ebdon (L), Hill (S) and Ward (RW). Directly coupled chromatography-atomic spectroscopy. Part 1. Directly coupled gas chromatography - atomic spectroscopy. A review. **Analyst** 111(10); 1986; 1113-1138

Review with 166 refereness. BV

1405 Flom (WD), Tanaka (N), Kovats (SK) and Finn (LM). Improved procedure for determining water activity in a high range. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 952-956

A procedure for accurate detn. of water activity in a high range (water activity between 0.920 and 0.970) using a Beckman Hygroline apparatus was devised because the prescribed calibration procedure was inadequate. This new procedure uses NaCl solutions as standards and the water activity values for NaCl solutions reported by Robinson as the reference scale. A quadratic calibration curve: Recorder reading = b_0 + b_1 water activity + b_2 water activity^2 was established for each sensor. A 3-point calibration scheme, taking measurements of 0.9m (molal), 1.6m, and 2.4m NaCl solutions, was used before and after a series of water activity measurements of samples to estimate b_0 and verify the constancy of shape of the calibration curve. The equation was solved for water activity to convert each recorder reading to an water activity value on Robinson's scale. This procedure yielded precision and accuracy levels for a single detn. of 0.0009 and 0.0013 water activity unit, respectively. Accuracy of 0.0009 water activity unit was obtained by averaging 2 detn. on different sensors. AS

1406 Klavons (JA) and Bennett (RD). Determination of methanol using alcohol oxidase and its application to methyl ester content of pectins. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 597-599

A method for the detn. of methanol using alcohol oxidase is presented. The procedure offers the advantage over other photometric procedures that use potassium permanganate as the oxidant in that a subsequent reduction step is eliminated. The sensitivity of the assay is 1-20 μg/mL of methanol. The procedure is rapid, selective, and versatile. The methyl ester content on a sample of pectin was determined from the methanol liberated upon its hydrolysis. AS

1407 Libbey (AJJr). Determination of ethylene dibromide in aquatic environments. **Analyst** 111(10); 1986; 1221-1222

Amberlite XAD-4 resin was employed for the extraction of ethylene dibromide (EDB) from water and the EDB was separated and determined by gas chromatography using an electron-capture detector. Samples spiked with EDB at the μg l^{-1} level exhibited a mean of 0.98μg l^{-1} a standard deviation of 0.105 μg l^{-1} and a 95% confidence level of the mean of 0.98 ± 0.04 μg l^{-1}. The average recovery was 90%. Analyses of samples spiked with EDB at the 50 ng l^{-1} level exhibited a mean of 52.9 ng l^{-1} a standard deviation of 12.5 ng l^{-1} and a 95% confidence level of the mean of 52.9 ± 12.5 ng l^{-1} with a recovery of 97%. A real sample gave a mean EDB concn. of 6.8 μg l^{-1} a standard deviation of 0.34 μg l^{-1} and a 95% confidence level of the mean of 6.8 ± 0.3 μg l^{-1}. This method represents the first reported use of an Amberlite resin for the detn. of EDB in water. AS

1408 Livingston (AL). Rapid analysis of xanthophyll and carotene in dried plant materials. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 1017-1019

1409 Marks (D), Glyphis (J) and Leighton (M). Measurement of protein in tannin-protein precipitates using ninhydrin. **Journal of the Science of Food and Agriculture** 38(3); 1987; 255-261

A method was tested for quantifying protein in precipitated tannin - protein complexes in which protein was hydrolysed with acid and the amino acids related were measured with ninhydrin. The amount of tannic acid required to precipitate maximal amounts of protease and Beta-glucosidase was approx. 7-8 times that required to cause maximal precipitation of albumin and Gamma-globulin when tested with 2 mg/ml protein. Per cent precipitation at each tannic acid concn. as measured with ninhydrin was identical to that determined by haemanalysis within the linear portions of the binding curves produced by the two methods. KAR

1410 Matsuhisa (K) and Ohzeki (K). **Determination of trace amounts of formaldehyde by ion-exchange resin thin-layer spectrophotometry. Analyst** 111(10); 1986; 1175-1177

A simple but highly sensitive method has been developed for the detn. of trace amounts of formaldehyde. The method proceeds as follows: (1) formaldehyde is reacted in alkaline media with 4-amino-3-hydrazino-5-mercapto-1,2,4-triazole; (2) the reaction product is oxidised with potassium periodate to a reddish purple complex; (3) the complex is concentrated and fixed on a finely divided anion-exchange resin using the batch method; (4) the resin is mixed with a finely divided cation-exchange resin and the mixed resins are filtered, leaving on the membrane filter a coloured thin-layer disc, 17 mm in diameter and about 0.2 mm thick; (5) the absorbance of this thin layer is measured directly with a spectrophotometer. The method was applied to the detn. of formaldehyde in an air sample. AS

1411 Newsome (WH). Potential and advantages of immunochemical methods for analysis of foods. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 919-923

The technique of immunochemical analysis, including the principles involved, is described and the various types of assay are discussed. Application of these methods to the analysis of foods for residues of pesticides, contaminants, drug residues, and natural constituents is reviewed. Compared with conventional methods, immunoassays offer similar detection limits and greatly simplified sample preparation procedures. AS

1412 Pablos (F), Gomez (JL) and Pino (F). N-oxalylamine (salicylaldehyde hydrazone) as an analytical fluorimetric reagent for the determination of nanogram amounts of aluminium. **Analyst** 111(10); 1986; 1159-1162

The synthesis, characteristics and analytical applications of N-oxalylamine (salicylaldehyde hydrazone), OSH, are described. The Al(III) - OSH system was studied and a spectrofluorimetric method is proposed for the detn. of Al in a medium of water - dimethylformamide (1 + 1) at pH 3.7. Under these conditions the complex has excitation and emission maxima at 387 and 474 nm, respectively. The detection limit is 5 p.p.b. and Al can be determined up to 160 p.p.b. Interferences were evaluated; Ga(III), In (III), Sb (III) and Zr (IV) gave the greatest perturbations. The method has been applied to the detn. of Al in mineral waters. AS

1413 Tsuji (S), Tonogai (Y) and Ito (Y). Rapid determination of mono-, di- and tri-isopropyl citrate in foods by gas chromatography. **Journal of Food Protection** 49(11); 1986; 914-916

A simple and rapid method for determining mono-, di- and tri-isopropyl citrates in foods was developed. Isopropyl citrates in butter and milk powder were extracted with ethyl acetate under acid condition and in edible oil with hexane. The ethyl acetate containing isopropyl citrates was evaporated and the residue was taken up in hexane. The isopropyl citrates in hexane were extracted into acetonitrile. After evaporation of the solvent, isopropyl citrates were methylated with diazomethane, and they were determined by gas chromatography. Recoveries of mono-, di- and tri-isopropyl citrates from edible oil, butter and milk powder by this method were more than 92.9, 95.7 and 94.8%, respectively. The detection limits of isopropyl citrates were 1 µg/g of sample. AS

1414 Van de Voort (FR), Mills (BL), Paquette (GA) and Grunfeld (E). Quantitative aqueous ammonium ion analysis by transmission infrared spectroscopy. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 924-928

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

Glucoamylases

1415 Nagamoto (H), Yasuda (T) and Inoue (H). Effect of organic solvents on the activity of glucoamylase. **Biotechnology and Bioengineering** 28(8); 1986; 1172-1177

Hydrolyses of maltose, maltotriose, and soluble starch catalyzed by glucoamylase (**Asp. niger**) were carried out in the aqueous solutions of methanol, ethanol, ethylene glycol, and 1, 4-dioxide at 40 C and at the optimum pH in the respective solutions. By the kinetic analysis based on the subsite model, it was shown that the intrinsic rate constant, k_{int}, was electrostatically affected by the dielectric constant of the hydroorganic solutions. The affinity of the third subsite, A_3 which affects the apparent rate constant, k_0 was correlated with the Delta $G_{tr's}$ of maltose and amino acid side chains. AS

Lipases

1416 Tahoun (MK), El-Sayed (MY) and Abou Donia (SA). Large agarose-lipase beads for the hydrolysis of triglycerides. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 183(5); 1986; 335-338

Pancreatic lipase could be immobilized by binding to large agarose beads or by entrapment within a polyacrylamide polymer. Large agarose beads, prepared from native agarose, were preferred for their higher binding capacity and easy intact separation for reuse. The agarose lipase complex is stable for 6 months at 4 C and pH 7.5. The immobilized lipase preparation maintained 80% of its initial activity even after reusing it eight times. Consequently, the immobilized lipase was recommended for semicontinuous hydrolysis of olive oil and milk fat trigylcerides. The amount of total hydrolysis was 31 ± 1.17% for milk fat compared with 27 ± 1.03% for olive oil. AS

Ethyl alcohol

1417 Fournier (R-L). Mathematical model of extractive fermentation: Application to the production of ethanol. **Biotechnology and Bioengineering** 28(8); 1986; 1206-1212

Fermented foods

1418 Aidoo (KE). Lesser-known fermented plant foods (Review). **Tropical Science** 26(4); 1986; 249-258

This paper reviews some of the lesser-known fermented foods which are important in the diet of people in the developing countries. Briefly discusses methods of preparation, microbiology, biochemical changes and the nutritional values of some of the fermented products. Fermented products covered are: products from cereal grains (**ting; ahia** and **pito**); products from legumes and other seeds (**ogiri**-water melon seed fermentation; **ugba**-African oil bean seed fermentation) lupin seeds; products from tubers (**Farinha puba**, **kokonte**; **Masato** or cassava beer); fruits and vegetables (**Tepache**, **Colonche**; **Gundruk** or Nepalese pickle, Sudanese **kawal**). BV

Microbiology

1419 Merrill (EP). Concentration of **Giardia** cysts from water by a centrifugal cream separator. **Journal of Food Protection** 49(11); 1986; 891-892

A method utilizing centrifugal separation followed by membrane filtration recovered 31 to 61% of **Giardia** cysts from 38-L samples of water. AS

1420 Warburton (DW) and Weiss (KF): Microbiological quality of non-dairy creamers, fillings and toppings. **Journal of Food Protection** 49(8); 1986; 621-622

Algae

Cyanidium caldarium

1421 Nagashima (H), Matsumoto (GI) and Fukuda (I). Hydrocarbons and fatty acids in two strains of the hot spring algae **Cyanidium caldarium**. **Phytochemistry** 25(10); 1986; 2339-2341

Bacteria

Enterobacteriaceae

1422 Cox (NA) and Bailey (JS). Enterobacteriaceae identification from stock cultures and high moisture foods with a four-hour system (API rapid E). **Journal of Food Protection** 49(8); 1986; 605-607

A new method, API rapid E method, was developed. It is a 4 h method which identified greater than 94% of the food isolates and one of the pathogenic members of Enterbacteriaceae family. The system is easy to inoculate. Results are obtained in 4 hour and its accuracy increase with increase in database. MVG

Lactobacillus

1423 Collins-Thompson (DL) and Thomson (IQ). Changes in manganese content in **Lactobacillus plantarum** during inhibition with sodium nitrite. **Journal of Food Protection** 49(8); 1986; 602-604

Lactobacillus plantarum ATCC 8014 and L. **plantarum** (MC) were sensitive to nitrogen peroxide under anaerobic conditions. This sensitivity was linked to an increase in cell-associated manganese levels. Normal manganese levels under aerobic conditions in the presence of nitrogen peroxide were 1×10^7 atoms/cell. Under anaerobic conditions with nitrogen peroxide, these levels increased to 3×10^8 to 2×10^9 atoms/cell depending on the sensitivity of lactobacilli to nitrogen peroxide. This study suggests that in trace metal metabolism, nitrogen peroxide may stimulate uptake or transport of ions such as manganese. AS

Plesiomonas

1424 Miller (ML) and Koburger (JA). Tolerance of **Plesiomonas shigelloides** to pH, sodium chloride and temperature. **Journal of Food Protection** 49(11); 1986; 877-879

Forty strains of **Plesiomonas shigelloides** representing environmental and clinical isolates were characterized as to their tolerance to sodium chloride, acid and alkaline conditions and growth temp. In tryptone broth all isolates grew in 3% but not 4% sodium chloride; whereas, in trypticase soy broth all isolates grew in 4% and 65% of them grew in 5% sodium chloride. All isolates initiated growth at pH 4.5 and 8.5 and 58% of the isolates grew at pH 4.0. Only 22% of the isolates grew at 8 C and 25% of them grew at 45 C. Heating at 60 C for 30 min destroyed all isolates tested. AS

Fungi

Aspergillus niger

1425 Iiczuk (Z) and Fiedurek (J). Synthesis of glucoamylase by somatic diploids of **Aspergillus niger** in submerged culture conditions. **Starch/Starke** 37(12); 1985; 428-431

Out of 12 forced heterocaryons of **A. niger**, in nine cases somatic diploids were obtained comprising a total of 107 strains. All were initially examined with respect to general amylase activity in test-tube microcultures. Over 21% of all diploid recombinants reached a higher coefficient of amylase activity than the parent haploid highly active in this respect. Four most active diploids selected from this group were examined with regard to glucoamylase synthesis. Also in this case diploids were characterized by a certain predominance in their activity over the initial prototrophic haploid strain (maximally about 16%). AS

Yeasts

1426 Gupta (JK), Jebsen (C) and Kneifel (H). Sinapic acid degradation by the yeast Rhodotorula glutinis. **Journal of General Microibology** 132(10); 1986; 2793-2799

The degradation of simple acid, a monomer of hardwood lignins, by the yeast **Rhodotorula** glutinis was studied. Syringic acid, 3-O-methyl gallic acid, and 2,6-dimethoxy-1,4-benzoquinone were identified as degradation products. Glucose was shown to be required for the demethylation of the methoxy groups on the ring. Unlike in the bacterium **Pseudomonos putida**, ring cleavage seemed to occur via gallic acid and not via methyl gallic acid. Cell-free oxidative decarboxylase (hydroxylase) activity was detected: this enzyme might be ultimately responsible for the formation of dimethoxyquinone. AS

1427 Huang (YT) and Kinsella (JE). Functional properties of phosphorylated yeast protein: Solubility, water-holding capacity, and viscosity. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 670-674

Phosphorylation of 30% of the lysine groups of yeast nucleoprotein facilitated the preparation of phosphoprotein (72%) with only 2.7% nucleic acid. Phosphorylation improved solubility slightly between pH 6.0 and 7.0 and greatly enhanced the water-holding capacity from 10 to 25 g of water/g of protein between pH 6 and 7.5. Viscosity increased with protein concn. and with pH, especially above pH 6.5 reflecting increasing electrostatic repulsion of the modified proteins. The phosphoproteins showed shear thinning at low shear rates, and viscosity decreased with increasing temp. The data indicated that phosphorylated yeast proteins might be useful as thickening agents in certain foods. AS

1428 Yamada (Y). The coenzyme Q system in strains of species in the anamorphic yeast genus Myxozyma. **Journal of General and Applied Microbiology** 32(3); 1986; 259-261

Hygiene

1429 Beckers (HJ). Incidence of foodborne disease in the Netherlands: Annual summary-1981. **Journal of Food Protection** 49(11); 1986; 924-931

BIOTECHNOLOGY

1430 Blake-Coleman (BC), Clarke (DJ), Calder (MR) and Moddy (SC). Determination of reactor biomass by acoustic resonance densitometry. **Biotechnology and Bioengineering** 28(8); 1986; 1241-1249

Acoustic resonance densitometry (ARD) is reported as a method suitable not only for precise investigations into changes of sp. gr. in bioreactor media but also as a technique able to provide an accurate wide range and direct detn. of cellular mass in fermentation processes. It is further shown that this method can replace present optical procedures, minimizing dilution errors and operator involvement and is suitable for development as an on-line biomass monitoring system. AS

1431 Henley (JP) and Sadana (A). Deactivation theory. **Biotechnology and Bioengineering** 28(8); 1986; 1277-1285

1432 Iijima (S), Kai (K), Mizutani (S) and Kobayashi (T). Effects of nutrients on Alpha-amylase production and plasmid stability in fed-batch culture of recombinant bacteria. **Journal of Chemical Technology and Biotechnology** 36(11); 1986; 539-546

Escherichia coli harbouring a recombinant plasmid containing the Alpha-amylase gene (HB101/pHI301) and its derivative which can stably maintain the plasmid (HB101/pHI301A) were cultivated in a mini-jar fermenter. By controlling dissolved oxygen (DO) at a concn. of 2-3µ g/l and supplementing with suitable amounts of nutrients, the organisms could grow to a concn. (up to 40 g dry cell l^{-1}) in a semi-synthetic casamino acid medium. During culture the plasmid was maintained stably in both strains. In a synthetic medium, both microorganisms grew less well and plasmid-free segregants were observed with HB101/pH1301 during the fed-batch culture. On the other hand, plasmid pHI301A was stably maintained throughout the fed-batch culture of HB101/pHI301A. Growth inhibitors, which may be metabolic products, accumulated in the medium and reduced bacterial growth. AS

1433 Kellens (MJ), Goderis (HL) and Tobback (PP). Biohydrogenation of unsaturated fatty acids by a mixed culture of rumen microorganisms. **Biotechnology and Bioengineering** 28(8); 1986; 1268-1276

The biohydrogenation of C-18 unsaturated fatty acids was examined in a mixed culture of microorganisms prepared by inoculating a proper growth medium with a sample of rumen fluid. Some major factors influencing the hydrogenation capacity have been investigated. The age of the mixed culture, the type of inoculum used, the concn. of substrates as well as the presence of sterile rumen fluid in the growth medium were found to be important factors determining biohydrogenation behavior. It could be shown that the mixed microbial culture, which had been grown for about 24 h on a medium similar to that of Bryant and Robinson, contained sterile rumen fluid (10% v/v), and had been inoculated with a sample of the whole untreated rumen content, had the best biohydrogenation capacity. The culture was able to carry out the complete conversion of linoleic and linolenic acid to stearic acid. AS

1434 Kleinstreuer (C) and Agarwal (SS). Analysis and simulation of hollow-fiber bioreactor dynamics. **Biotechnology and Bioengineering** 28(8); 1986; 1233-1240

1435 Lortie (R) and Thomas (D). Heterogeneous one-dimensional model for fixed bed enzyme reactors. **Biotechnology and Bioengineering** 28(8); 1986; 1256-1260

1436 Richmond (AE). Microalgaculture. **CRC Critical Reviews in Biotechnology** 4(4); 1986; 369-438

Review covers production of microalgae for the dual purposes of producing animal feed and clearing waste water, production of chemicals and biochemicals from microalgae; microalgae as nitrogen fertilizer; microalgae as potential food staple for humans and animals; microalgae of commercial interest (**Spirulina** as a food supplement for humans, products from **Spirulina**, commercial production of **Spirulina**; therapeutic properties of **Spirulina**, **Chlorella**, **Dunaliella**, **Scenedesmus**, **Porphyridium**; **Phaeodactylum**, **Botryococcus braunii**, **Chlamydomonas**); Environmental factors in algalculture; microalgae nutrition; large-scale outdoor microalgaculture (biological aspects, technological aspects, dehydration of the algal mass); maintenance of mass algalcultures; production of algal biomass on waste water and animal wastes and the future of large-scale algalculture. BV

TISSUE CULTURE

Nil

FOOD ADDITIVES

Preservatives

Sorbic acid

1437 Daley (JD), Lloyd (GT), Ramshaw (EH) and Stark (W). Off-flavours related to the use of sorbic acid as a food preservative. **CSIRO Food Research Quarterly** 46(3); 1986; 59-63

Describes the presence of "keroseni" off-flavour in a cheese-based spread contaminated with mould and illustrates the disadvantages of using sorbic acid as a preservative when mould growth occurs. BV

Stabilizers

Carrageenans

1438 Nguyen (AL) and Luong (JHT). Diffusion in K-carrageenan gelbeads. **Biotechnology and Bioengineering** 28(8); 1986; 1261-1267

CEREALS

1439 Cohen (H) and Lapointe (M). Determination of ochratoxin A in animal feed and cereal grains by liquid chromatography with fluorescence detection. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 957-959

A liquid chromatographic method is described for detn. of ochratoxin A in animal feeds and cereal grains. Samples are initially extracted with chloroform-ethanol (8 + 2) and 5% acetic acid in water. Extracts are purified using a silica gel cartridge followed by a cyano cartridge. The samples are evaporated, diluted to a known volume, and analyzed using a 10 cm column of $3 \mu C_{18}$ and a fluorescence detector. The method was applied to a variety of animal feeds and cereal grains at levels of 1.0-0.005 p.p.m added ochratoxin A. The overall recovery was 90.6% ± 3.6. AS

1440 Heikes (DL) and Hopper (ML). Purge and trap method for determination of fumigants in whole grains, milled grain products, and intermediate grain-based foods. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 990-998

1441 Sinha (RN), Abramson (D) and Mills (JT). Interrelations among ecological variables in stored cereals and associations with mycotoxin production in the climatic zones of Western Canada. **Journal of Food Protection** 47(8); 1986; 608-614

Objective evaluation of several storage fungi, mites free fatty acids and feed germination was carried out in order to demonstrate the usefulness of these variables in determining the ochratoxin contamination in stored cereals particularly when moisture is low and acceptable. Results also showed that conditions that favour growth of storage fungi and mycotoxin production were restricted to selected zones even within single crop years. These regions could be identified if several biodeterioration variables were considered and principal component analyses in conjunction with Kendall's rating correlation was applied. MVG

Barley

Malt

1442 Fors (SM) and Eriksson (CE). Pyrazines in extruded malt. **Journal of the Science of Food and Agriculture** 37(10); 1986; 991-1000

Green malt, partially dried, was processed by high-temp. short-time (HTST) extrusion cooking at three different temp. The concn. of pyrazines increased when the temp. was raised from 130 to 160 C, but it fell at 190 C. Extruded malt contained more total pyrazines than the conventionally processed malt 2-vinyl-5-methyl pyrazine and 2-vinyl 6 - methylpyrazine were found only in extruded malt, especially at high processing temp. KAR

Rice

1443 Palaniswamy (PT) and Dakshinamurthy (A). Biogas to control rice storage pests. **International Rice Research Newsletter** 11(6); 1986; 25

Twenty five adults of each of **S. cerelella**, **S. oryzae** and **R.**

dominica were placed in 1kg - capacity closed glass containers and subjected to biogas at 20 l/min at 28 C room temp. and 80% relative humidity. Within 30-50 sec. all test insects died. No insects died in the untreated check. KAR

1444 Wadsworth (JI) and Matthews (J). Variation in rice associated with kernel thickness. I. Chemical composition. **Tropical Science** 26(3); 1986; 195-212

Wheat

1445 Lindahl (L) and Eliasson (A-C). Effects of wheat proteins on the viscoelastic properties of starch gels. **Journal of the Science of Food and Agriculture** 37(11); 1986; 1125-1132

The interactions between starch and wheat proteins were studied in oscillatory rheological measurements. The starch varieties examined were maize, barley, wheat, triticale, rye and potato. The storage modulus, G′, and the phase angle, Delta, were found to be most sensitive to the composition of the starch gel. When starch was gelatinised in presence of gluten it was found that G′ increased for wheat and rye starches whereas the presence of gluten proteins caused the opposite effect to maize starch. The viscoelastic behaviour of the other starches was not affected by the presence of gluten. A water soluble wheat protein fraction had the same effect on the viscoelastic behaviour of wheat starch as gluten, whereas ligonin behaved like a polar lipid. AS

Wheat starch

1446 Atkins (DP) and Kennedy (JF). A comparison of the susceptibility of two commercial grades of wheat starch to enzymic hydrolysis and their resultant oligosaccharide product spectra. **Starch/Starke** 37(12); 1985; 421-427

Solutions of 2 commercial fractions of wheat starch, which are separated by their granule size, have been found to differ both in their susceptibility to hydrolysis by Alpha-amylase and in the oligosaccharide spectra of their resultant hydrolysates. These effects have been ascribed to a reduced proportion of amylose and a higher degree of (1→6) branching identified in the starch of the smaller granules. AS

1447 Eliasson (AC). Starch gelatinization in the presence of emulsifiers. A morphological study of wheat starch. **Starch/Starke** 37(12); 1985; 411-415

Wheat starch was heated in the presence of emulsifiers (sodium dodecyl sulphate, (SDS), sodium stearoyl-lactylate, (SSL), and glycerol-monostearate, GMS) and samples were viewed in the scanning electron microscope after heating at different temp. It was found that the typical morphological changes occurring when the large wheat starch granules are heated occurred at lower temp. in the presence of SDS, and at higher temp. in the presence of GMS or SSL compared to the control without any added emulsifier. Gel volumes changed in the same way, and the amount of amylose leached from the granules decreased in the presence of emulsifiers. AS

MILLETS

1448 Ji (C), Xu (X-ZK), Li (M-X), Li (G-Y) and Li (J-L). A new N-nitroso compound, N-(2-methylpropyl)-N-(1-methylacetonyl) nitrosamine, in moldy millet and wheat flour. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 628-632

The isolation and detection of a new N-nitroso compound, N-(2-methyl propyl)-N-(1-methylacetonyl) nitrosamine (NMAMPA) from moldy foods were reported. The role of the fungus, **Fusarium moniliform** Sheldon in the process of nitrosamine formation and the possible biosynthesis of the new compound were also discussed. OES

Corn

1449 Lillehoj (EB), Jacks (TJ) and Calvert (OH). Aflatoxin estimation in corn by measurement of bright greenish-yellow fluorescence in aqueous extracts. **Journal of Food Protection** 49(8); 1986; 623-626

1450 Robertson (GH), Zaragosa (EM) and Pavlath (AE). Saccharification of explosively dried corn. **Biotechnology and Bioengineering** 28(8); 1986; 1159-1165

Very rapid or explosive drying of grains such as corn leads to obevious physical changes in the macrostructure of the grain kernel, probable alteration in starch mol. structure, and reduction in starch average mol. wt. These changes lead to greater susceptibility to attack by liquefying and saccharifying enzymes. Rates of formation of nonreducing and reducing sugars by liquefying and saccharifying enzymes applied to explosively dried and milled yellow dent corn and small-kernel flint corn were 3.3-10.6 times greater than rates for the normally milled grains. The enzymatic conversion of explosively dried flint corn containing absorbed ethyl alcohol, as would be the case if it had been used as an adsorbent to dewater aqueous ethyl alcohol, was not significantly different from that of ethyl alcohol free flint corn. AS

Sorghum

1451 Hamaker (BR), Kirleis (AW), Mertz (ET) and Axtell (JD). Effect of cooking on the protein profiles and in vitro digestibility of sorghum and maize. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 647-649

Uncooked sorghum was almost as digestible as uncooked maize when assayed **in vitro** with pepsin and/or a mixture of trypsin and chymotrysin. Sorghum protein digestibility, however, was significantly decreased after cooking. In contrast, cooking had increased the maize protein digestibility with trypsin-chymotrypsin and pepsin-trypsin-chymotrypsin digestion. On cooking, sorghum prolamins become much less soluble and less easily digestible with pepsin than the maize prolamins. This could explain the lower digestibility of cooked sorghum proteins in young children. OES

1452 Rustom Ali (M) and Wills (RBH). A small, simple sorghum decorticating device. **Journal of the Science of Food and Agriculture** 37(12); 1986; 1192-1196

A small commercially available laboratory mill was found to be suitable to dehull small batches of sorghum grain. The device used one grinding plate and an agitating dimpled plate and took about 1 min to adequately dehull the grain. At the completion of dehulling period decorticated grain was collected directly in a sample holder. Data from various cv., grain sizes and types of grain were reproducible. It only required 10 s to clear the device between samples. AS

PULSES

1453 Tarrach (F) and Herrmann (K). Organic acids of vegetables. III. Changes in acids and sugars during development and ripening of beans, peas, and broad beans. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 183(5); 1986; 352-356 (De).

During development and ripening the seeds of the legumes, beans, peas, and broad beans show a decreasing content of malic, succinic and fumaric acid whereas the content of citric acid is increasing. Pods show growing concn. of malic, succinic, fumaric and especially citric acid. In the early stage of development malic acid predominates in seeds and pods, while in the ripening to dryness stage citric acid predominates. Malic and citric acid are the main organic acids. Furthermore in dry seeds and pods malonic, quinic, shikimic and at times tartaric and aconitic-acid were found usually in small concn. Among sugars sucrose predominates in the seeds. Glucose and fructose are found in nearly equal concn. In all species pods contain a comparatively high amount of glucose. During ripening, in contrast to the organic acids, the concn. of all the examined sugars decreases to a greater or lesser extent in both seeds and pods. AS

Broad beans

1454 Youssef (MM), Hamza (MA), Abd-El-Aal (MH), Shekib (DA) and El-Banna (AA). Amino acid composition and in vitro digestibility of some Egyptian foods made from faba bean (**Vicia faba** L.). **Food Chemistry** 22(3); 1986; 225-233

The amino acid composition and the, **in vitro** digestibility of four dishes-**Medammis**, **Falafel**, **Bessara** and Nabet Soup - made from faba beans (**Vicia faba** L) were determined and compared with that of raw beans. Severe heat processing markedly decreased some essential amino acids, especially phenyl alanine, cystine, methionine and tryptophan. Protein scores were 38, 21.2, 39.3, 33.7 and 42.4% for raw faba beans, **Medammis**, **Falafel**, **Bessara** and **Nabet** soup respectively. Cooking resulted in a considerable increase in the in **vitro** protein digestibility, highest being that of **Nabet** soup (98.4%) as compared to that of casein (99.6%). The values for raw beans, **Medammis**, **Falafel** and **Bissara** were 75.9, 92.7, 85.0 and 97.2% respectively. OES

Cowpeas

1455 Enwere (NJ) and Ngoddy (PO). Effect of heat treatment on selected functional properties of cowpea flour. **Tropical Science** 26(4); 1986; 223-232

The present study to determine the effect of different tempering and drying conditions on selected functional properties of cowpea flour showed that drying cowpea seeds at a temp of 30 C for up to 16h does not alter any of the functional properties. Drying temp. between 60 and 120 C decreased N solubility, hot water absorption, swelling capacity, whippability, foaming and foam stability, but increased the least gelling concn. of the resulting cowpea flour. B

1456 Ngoddy (PO), Enwere (NJ) and Onuorah (VI). Cowpea flour performance **akara** and **moin-moin** preparations. **Tropical Science** 26(2); 1986; 10 119

Cowpea flours from seeds dried at temp. between 30 and 80 C ar milled in two and three passes (a 1 mm sieve to produce flours differing in particle-size distribution) produced **moin-moin** (Nigeria steamed cowpea paste) with optimum organoleptic qualities. Cowpe flours from seeds dried at temp. between 30 and 60 C and milled i one and two passes produced akara (Nigerian fried cowpea paste) wit superior organoleptic qualities. BV

Green beans

1457 Muftugil (N). Effect of different types of blanching on the colour an the ascorbic acid and chlorophyll contents of green beans. **Journal o Food Processing and Preservation** 10(1); 1986; 69-76

The blanching methods were water blanching, steam blanching microwave blanching and convection oven blanching. Ascorbic acid an chlorophyll contents were found to be highest in the microwave blanched sample. The results of colour measurements with Hunterlab colormeter indicated that blanching with water and steam resulted in more intense greenness of the samples. KAR

Phaseolus vulgaris

1458 Hoover (R) and Sosulski (F). A comparative study of the effect of acetylation on starches of **Phaseolus vulgaris** biotypes. **Starch/Starke** 37(12); 1985; 397-404

Winged beans

1459 Kortt (AA) and Bruce Caldwell (J). Isolation and properties of the lectins from the tuberous roots of winged bean**Psophocarpus tetragonolobus**(L.) DC. **Journal of the Science of Food and Agriculture** 39(1); 1987; 47-57

The tuberous roots contain two distinct groups of lectins corresponding to the acidic and basic lectins of the seed. These lectins were essentially identical to that of the corresponding winged bean seed lectins. KAR

OILSEEDS AND NUTS

Coconuts

1460 Mathew (CD) and Balasubramaniam (K). Chemical modification of Alpha-galactosidase from coconut. **Phytochemistry** 25(11); 1986; 2439-2443

Alpha-Galactosidase from coconut kernel was inhibited by chemical modification of its tyrosine, tryptophan and carboxyl groups. Treatment with N-bromosuccinamide and tetranitromethane indicated that modification on one tryptophan and one tyrosine residue inhibited enzyme activity by 55 and 84%, respectively. Modification of carboxyl groups by carbodiimide indicated that inhibition was due to modification of two carboxyl groups. In the presence of the competitive inhibitor D-galactose, Alpha-galactosidase was protected from inhibition by N-bromosuccinamide, tetranitromethane and carbodiimide. These results indicate that a tryptophan, tyrosine and two carboxyl groups are at or near the active site of alpha-galactosidase. AS

1461 Samarajeewa (U) and Chamara illeperuma (DK). Moisture adsorption through packaging materials used for desiccated coconuts. **Journal of the National Science Council of Sri Lanka** 13(1); 1985; 45-52

This study examined the 6 types of packaging materials used for the storage of desiccated coconuts (DC) and were compared at different RH with respect to their moisture adsorption/desorption patterns. Results indicated that the LDPE appeared to permit the adsorption of moisture allowing DC to reach the critical moisture level of 3.5% in about a month. The double laminated aluminium/polyethylene materials showed better resistance to moisture movements across them and DCs did not gain moisture to reach the critical level of 3.5% at RH below 80% and at RH of the atm. BV

Cottonseeds

1462 Osman (HOA), Khalil (M), El-Mahdy (AR) and El-Iraki (S). Preparation, evaluation and functional properties of gossypol-poor cottonseed protein isolates. **Food Chemistry** 24(2); 1987; 109-126

Gossypol poor cottonseed protein isolate showed good whipping capacities. Their foaming capacities allow their use in topping, chiffon mixes and confectionery products especially at neutral pH. In emulsion capacity two fractions were equal to albumin while another was even superior to albumin. KAR

Groundnuts

1463 Basha (SM) and Pancholy (SK). Qualitative and quantitative changes in the protein composition of peanut (**Arachis hypogaea** L.) seed following infestation with **Aspergillus** spp. differing in aflatoxin production. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 638-643

Peanut (**Arachis hypogaea** L.) seed CV. Early Bunch was inoculated with four different **Aspergillus** lines (NRRL 2999, NRRL 502, NRRL 3357, NRRL 3239) differing in their aflatoxin production capacities. Analyses of the seeds showed that **Aspergillus spp.** infestation caused a decrease in oil, iodine value, soluble carbohydrates, and protein content. Gel filtration studies indicated changes in the seed protein composition while one-dimensional gel electrophoresis revealed that following fungal infestation arachin became more acidic accompanied by the appearance of a basic protein. Two-dimensional gel electrophoresis showed gradual disappearance of a high mol. wt. (70000) polypeptide with an apparent pI between 5.8 and 6.4. In addition, several polypeptides with mol. wt. between 16 000 and 34 000 also appeared after 9 days of infestation. AS

1464 Ihekoronye (AI). Functional properties of meal products of the Nigerian 'Red skin' groundnut (**Arachis hypogaea** L.). **Journal of the Science of Food and Agriculture** 37(10); 1986; 1035-1041

Groundnut protein conc. (GPC) prepared by isoelectric centrifugation 50 C and pH 4 rather than by solvent extraction had a higher protein content and performed better than the solvent defatted or non-defatted sausages. Its high emulsification properties, water and fat absorption capacities, good whippability and foam stability have significant implications for potential food uses. Since a 5% aqueous dispersion of GPC performed better than egg white in foamability and foam stability, it could be useful for aeration in food systems to give textural and leavening characteristics. KAR

1465 Lansden (JA). Determination of cyclopiazonic acid in peanuts and corn by thin layer chromatography. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 964-966

A thin layer chromatographic system including densitometry has been developed for determining cyclopiazonic acid in peanuts and corn. Samples are extracted with methanol-chloroform (20 + 80); the extract is stripped of most interferences by partitioning with aqueous sodium bicarbonate followed by acidification and repartitioning with chloroform. After thin layer chromatography and derivatization with dimethylaminobenzaldehyde-HCl spray, the toxin is quantitated by reflection densitometry at 540 nm. The recovery of cyclopiazonic acid averages 90% for peanuts and 85% for corn. The absolute detection limit is 25 ng per spot which translates to a detection limit of 125μ g/kg for a 50 g sample. AS

1466 St Angelo (AJ) and Graves (EE). Studies of lipid-protein interaction in stored raw peanuts and peanut flours. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 643-646

The protein-lipid interactions that occurred in stored raw peanuts and peanut flour were reported in this study. Polar and non polar lipids were extracted from proteins with an acidic solvent system comprising of chloroform, methanol and hydrochloric acid. The neutral fractions contained sterols, triglycerides, esterified and free fatty acids. The polar fraction contained phospho- and glyco- lipids. The electrophoretic mobilities of the proteins that contained bound lipids were changed after removal of lipids by solvent extractions. Results of this study could be useful to understand the factor that affected the quality and stability of peanuts and products stored for long periods before use. OES

Palms

1467 Jayalekshmy (A), Narayanan (CS) and Mathew (AG). Volatile aroma compounds of raw and roasted palm kernel. **Journal of the Science of Food and Agriculture** 39(1); 1987; 35-45

The volatile aroma compounds of raw and roasted palm kernel, isolated by hydrodistillation, were analysed by GLC and GC-MS. A number of compounds have been identified for the first time in this commodity. It was found that Alpha-lactones and ethyl esters were predominant in the flavour profile. In roasted palm kernels, flavour analysis showed the presence of a number of pyrazines formed during heating. Most of the lactones and esters identified in raw palm kernel were present in the roasted samples also. The flavour conc. included a number of fatty acids in both the raw and roasted samples, in small amounts. AS

Rapeseeds

1468 Vermorel (M), Heaney (RK) and Roger Fenwick (G). Nutritive value of rapeseed meal: Effects of individual glucosinolates. **Journal of the Science of Food and Agriculture** 37(12); 1986; 1197-1202

Rats were fed diets containing progoitrin and glucosinapin both of which are the major components of high glucosinolate rapeseed cv. No reduction of food intake or growth rate was noted and thyroid wt. were significantly affected only by the progoitrin diet, which also produced small increases in the wt. of the livers and kidneys. KAR

Safflower

69 Paredes-Lopez (O) and Ordorica-Falomir (C). Functional properties of safflower protein isolates: Water absorption, whipping and emulsifying characteristics. **Journal of the Science of Food and Agriculture** 37(11); 1986; 1104-1108

Safflower meal defatted at the laboratory (SML) and safflower cake provided by an industrial plant (SMI) were used for protein isolation. Isolates were obtained by micellisation (MP) and isoelectric precipitation (IP) techniques. The functional properties studied with these isolates were water and fat absorption, foam expansion and stability, and emulsion activity and stability. Within the experimental conditions of this research, it was observed that the various treatments received previously by the safflower meal, for oil extraction, seemed to have comparatively minor effects on the functional performance of the protein isolates. Only in the case of SML, did the MP isolates have a higher water and fat absorption, and foam expansion than IP samples. For both SML and SMI, the emulsion stability of MP was higher than that of IP. AS

470 Paredes-Lopez (O) and Ordorica-Falomir (C). Production of safflower protein isolates: Composition, yield and protein quality. **Journal of the Science of Food and Agriculture** 37(11); 1986; 1097-1103

The use of laboratory-and commercially-prepared safflower meal for the production of protein isolates is described. The isolates were obtained by micellisation and isoelectric precipitation techniques, the latter being the most efficient procedure. Previous treatments received by the meal, for example heating, influenced the protein recovery. In general, isolates produced by micellisation were more soluble than samples obtained by isoelectric precipitation. The colour of the protein isolates depended on the isolation technique and type of safflower meal utilised. All isolates had a similar amino acid composition and levels of **in-vitro** protein digestibility. AS

Soybeans

471 Grant (G), McKenzie (NH), Watt (WB), Stewart (JC), Dorward (PM) and Pusztai (A). Nutritional evaluation of soybeans (**Glycine max**): Nitrogen balance and fractionation studies. **Journal of the Science of Food and Agriculture** 37(10); 1986; 1001-1010

The poor nutritional performance of rats fed raw soybean-containing diets appeared to be due to reduced apparent digestion and absorption of dietary protein, coupled to changes in systemic metabolism leading to a poor overall nitrogen balance. Aqueous heat treatment greatly reduced but did not eliminate the antinutritional effect. Heat treatment with aqueous ethanol was more effective. The whey protein (pH 4.8 soluble extract) fraction contained the bulk of the trypsin inhibitor and haemagglutination activity and gave the poorest net protein utilisation value. However, an eight-fold increase in trypsin inhibitor content did not significantly effect apparent nitrogen digestibility. Therefore inhibition of gut proteolytic enzyme activity **in vivo** by soybean trypsin inhibitors did not account fully for the poor nutritional performance. The problems elicited by soybean are not transitory and thus there was a cumulative deterioration in overall performance for 16 wk as a result of continuous exposure to soybean. AS

1472 Kim (SH) and Kinsella (JE). Effects of reduction with dithiothreitol on some mol. properties of soy glycinin. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 623-627

The effects of reduction with dithiothreitol (DTT) of both inter and intramolecular disulphide bonds on the structure and conformation of soy glycinin were reported. OES

1473 Price (KR), Fenwick (GR) and Jurzysta (M). Soyasapogenols-Separation, analysis and interconversions. **Journal of the Science of Food and Agriculture** 37(10); 1986; 1027-1034

The hydrolysis products of soyasaponins in legumes and of pure standards have been examined using TLC, GC, and GC-MS Interrelationships between eight soyasapogenols, produced under conditions of aqueous or non-aqueous acid hydrolysis have been established. The significance of the work to the analysis of soyasaponins is discussed. AS

Soy proteins

1474 Bouvier (JM), Fayard (G) and Clayton (JT). Flow rate and heat transfer modelling in extrusion cooking of soy protein. **Journal of Food Engineering** 6(2); 1987; 123-141

The paper presents a model representing the heat transfer in extrusion cooking defatted soy protein flour in a single screw extruder - using the temp. profiles, the flow rates are then determined for various screw speeds (30 - 133 rpm) and barrel temp (150 - 190 C) by applying the Non-Newtonian analysis previously used in polymer processing. The predicted values are compared with experimental values. KAR

1475 Velisek (J), Davidek (J) and Kubelka (V). Formation of 3,5-diene and 3-chloro 3,5 5-ene analogues of sterols in protein hydrolysates. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 660-662

TUBERS AND VEGETABLES

Bulb vegetables

Onions

1476 Solomon (HM) and Kautter (DA). Growth and toxin production by **Clostridium botulinum** in Sauteed onions. **Journal of Food Protection** 49(8); 1986; 618-620

In October, 1983 sauteed onions in "patty-melt" sandwiches were epidemiologically responsible for a large outbreak of botulism in Peoria, Illinois. Spores of strains of **Clostridium botulinum** type A, recovered from Spanish onions or from patients who consumed sauteed onions, produced high toxin titers within 48 h from 2 spores/g of onions when experimentally inoculated into sauteed onions. Laboratory strains of C. botulinum type A which normally produce high-titered toxin in culture media yielded very low toxin titers and required 3 to 4 d and an extremely high inoculum of spores/g of onions. Five strains of C. botulinum type A were isolated from 75 raw onions obtained from the Peoria restaurant where the outbreak occurred. AS

Tubers

Cassava

1477 Raja (KCM), Ramakrishna (SV) and Mathew (AG). Effect of steam-hydrothermal treatment (SHTT) on the physico-chemical properties of cassava (**Manihot esculenta** Crantz). **Journal of the Science of Food and Agriculture** 39(1); 1987; 59-71

Effect of steam-hydrothermal treatment (SHTT) on functional properties of cassava was studied using fresh tubers of cultivar Malayan-4 (M-4). Fresh slices were steam-processed for 5, 10 and 20 min at atm. pressure. Plain-dried samples were also prepared for comparison. SHTT samples were found to have higher rehydration capacity, equilibrium moisture content by soaking (EMC-S), and sedimentation volume at room temp. (28-30 C). These samples also showed a lower amylose content than plain-dried samples. Electrolytes like sodium chloride, sodium sulphate and sodium phosphate at 1.0 N conc. changed the sedimentation volume, especially of SHTT samples. Paste stability of steam-processed samples at cooking temp. (95 C) was relatively higher than plain-dried ones. Among the three SHTT samples, that steam-processed for 10 min showed the highest paste consistency and set-back ratio. X-ray diffraction pattern of flour prepared from SHTT samples indicated a clear shift from crystalline to a partially amorphous state. Infra-red spectra of cassava starch and flour samples were generally identical. AS

Potatoes

1478 Carlin (JT), Jin (QZ), Huang (T-C), Ho (C-T) and Chang (SS). Identification of alkyloxazoles in the volatile compounds from French-fried potatoes. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 621-623

Twenty four alkyloxazoles were identified in the volatile compounds from French fried potatoes, eleven of which were reported for the first time as components of food. The synthesis and mass spectral data of these oxazoles were discussed. OES

1479 Gill (PA) and Waister (PD). Effects of solute gradients on the osmotic potential of potato tubers stored at two temperatures. **Journal of the Science of Food and Agriculture** 38(3); 1987; 247-253

Tubers of the potato (**Solanum tuberosum** L.) cv. Pentland Crown were stored at either 2 C or 16 C in the dark. The concn. of the major osmotica were measured at three positions along the tuber, together with parallel cryoscopic measurements of osmotic potential. Positive gradients of concn. of potassium and organic acids, from the base to the apex of the tuber, were approx. balanced in their osmotic effect by negative gradients of soluble sugars. Tubers stored at 16 C showed a small net negative gradient of osmotic potential, and those at 2 C a slightly larger positive gradient. This difference was attributed to the steeper gradient of soluble sugars in tubers stored at 2 C. There were no significant differences in the gradients of potassium, magnesium and organic acids between the two temp. treatments, nor were there any detectable changes in these gradients with time in storage. AS

Potato crisps

1480 Asap (T) and Augustin (MA). Effect of frying oil quality and TBHQ on the shelf-life of potato crisps. **Journal of the Science of Food and**

Agriculture 37(10); 1986; 1045-1051

The effect of frying oil quality and tertiary butyl hydroquinone (TBHQ) on the shelf-life of the fried potato crisps was evaluated. Batches of potato slices were fried for 4 min at 30 min intervals over a period of 5 h/day for 8 consecutive days in refined, bleached and deodourised palm olein without antioxidant (system 1), RBD containing 200 µg/g TBHQ at the start of the experiment (system 2); and RBD olein which had TBHQ topped up to a level of 200 µg/g at the start of each frying day (system 3). Sensory evaluation of crisps showed that there is an initial required decrease in shelf-life with increase in fry-number in all systems. There was only a comparatively smaller effect on shelf-life with increase in fry number in later fryings. TBHQ does have a protective carry-through effect, up to 200 µg/g at the beginning of each frying day. KAR

Potato starch

1481 Ceh (M), Stropnik (C) and Leskovar (S). Stepwise elution analysis of fractions of thermically dispersed high amylose, potato and waxy corn starch. **Starch/Starke** 37(12); 1985; 415-421 (De).

1482 Mica (B). Relationship of sort and environmental conditions with dry substance and starch content of potatoes. **Starch/Starke** 37(12); 1985; 407-410 (De).

Vegetables

1483 Khachik (F), Beecher (GR) and Whittaker (NF). Separation, identification, and quantification of the major carotenoid and chlorophyll constituents in extracts of several green vegetables by liquid chromatography. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 603-616

1484 Winter (M) and Herrmann (K). Esters and glucosides of hydroxycinnamic acids in vegetables. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 616-620

Quinic, tartaric, and malic acid esters as well as glucose esters and the glucosides of hydroxycinnamic acids have been determined qualitatively and quantitatively by HPLC in tomatoes (two states of ripeness (green and red) and different types), bell pepper, eggplant, spinach, mangold, beetroot, pea, bush bean, broad bean, lettuce (outer and inner leaves separated), endive, and chicory. AS

Eggplant

1485 Aluko (R) and Ogbadu (GH). Analysis of eggplant varieties for enzymes related to their organoleptic properties. **Tropical Science** 26(3); 1986; 163-171

Five var. of egg plants were analysed for their chem. and biochemical properties. Results of the proximate analysis indicate that the round green var. possesses the best qualities for storage and resistance to injury and disease. The purple var. was most susceptible to endogenous damage due to high moisture content, high polyphenol oxidase, and ATPase activities and very low peroxidase level. BV

Green peppers

1486 Wu (CM) and Liou (SE). Effect of tissue disruption on volatile constituents of bell peppers. **Journal of Agricultural and Food Chemistry**

34(4); 1986; 770-772

Red peppers

1487 Lurie (S) and Ben-Yehoshua (S). Changes in membrane properties and abscisic acid during senescence of harvested bell pepper fruit. **Journal of the American Society for Horticultural Science** 111(6); 1986; 886-889

Membrane permeability in green and red bell peppers (**Capsicum annum** L) increased as measured by leakage of electrolytes and ninhydrin-reacting substances, such as amino acids. In red peppers, the increase in microviscosity occurred sooner that is green peppers, and the membrane leakage was higher. A connection between sterol level and membrane microviscosity was observed. Abscisic acid levels showed an increase during senescence, followed by a decrease that was more dramatic is green pepper. KAR

1488 Lurie (S), Shapiro (B) and Ben-Yehoshua (S). Effects of water stress and degree of ripeness on rate of senescence of harvested bell pepper fruit. **Journal of the American Society for Horticultural Science** 111(6); 1986; 880-885

Red pepper (**Capsicum annum**) at harvest was less firm and had lower water potential, lower insoluble pectins, and higher water soluble pectins than green bell pepper. The changes occurring in both types of pepper after harvest were similar. Post harvest wt. loss was accompanied by a decrease in firmness, decrease in water potential, decrese in insoluble pectin, and an increase in soluble pectin in the cell wall. KAR

FRUITS

1489 Thomas (P). Radiation preservation of foods of plant origin. Part V. Temperate fruits: Pome fruits, stone fruits, and berries. **CRC Critical Reviews in Food Science and Nutrition** 24(4); 1986; 357-400

Review covers the current status of research on the application of ionizing radiation for improving the storage of temperate fruits (apple, pear, peach, nectarine, apricot, cherry, plum, strawberry, bilberry, cranberry, raspberry and blackcurrant). Changes in fruit metabolism, chemical composition, texture, organoleptic quality with reference to irradiation dose; feasibility of using radiation (either alone or with heat treatment, refrigeration, and controlled atmospheres) for the control of storage decay caused by fungal pathogens; use of irradiation for disinfestation of certain pome and stone fruits; commercial utilization of irradiation for improving shelflife and areas of further research are also discussed. BV

1490 Warnasuriya (D), Liyanage (AW), Weerawansa (GG), Athauda (PK) and Jayatissa (PM). Isolation and characterization of yeasts of some fruits and fruit products of Sri Lanka. **Journal of the National Science Council of Sri Lanka** 13(1); 1985; 71-75

Apples

1491 Hajslova (J), Kocourek (V), Jehlickova (Z) and Davidek (J). The fate of ethylene bis (dithiocarbamate) fungicides during processing of contaminated apples. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 183(5); 1986; 348-351

A spectrophotometric method based on the liberation of carbon disulphide is suitable for the detn. of ethylene bis (dithiocarbamate) (EBDC) residues on apples. Homogenization of samples before analysis initiates rapid breakdown of EBDC, resulting in low recoveries. Thermal conversion of mancozeb to ethylenethiourea (ETU) in the course of apple processing was investigated. The formation of ETU from EBDC could be reduced by lowering the pH value. The presence of an antioxidant (ascorbic acid or cysteine) significantly diminished the yields of ETU after heating, but they inhibited its subsequent decomposition. The rate of ETU formation did not correspond to a relatively rapid disappearance of the parent compound. The levels of ETU residues in the canned baby food originating from contaminated apples were evaluated after a 9-months storage period; the reduction of ETU amounts varied from 26 to 70%. AS

1492 Lidster (PD), Dick (AJ), DeMarco (A) and McRae (KB). Application of flavonoid glycosides and phenolic acids to suppress firmness loss in apples. **Journal of the American Society for Horticultural Science** 111(6); 1986; 892-896

Vacuum infusion or dipping fruit in solutions of an apple (**Malus domestica** Borkh.) extract containing chlorogenic acid, catechins, and quercetin glycosides (isolated from 'Spartan' apples) suppressed fruit softening of 'Spartan' and 'Golden Delicious' apple held at 20 C. Quercetin or rutin [0.01% or 0.05% (w/v)], applied by post-harvest vacuum infusion or dipping, reduced softening of 'Golden Delicious' apples held at 20 and 0 C. Structurally related compounds (catechin, coumaric acid, and chlorogenic acid) showed some potential for retarding fruit softening but the effects were inconsistent. Additions of 0.25% (w/v) thickener plus 0.1% surfactant to the dipping solution containing the above compounds further reduced fruit firmness loss in storage. When quercetin or rutin were vacuum-infused either before or after CA storage, fruit were firmer than control fruit over a 25-day period at 20 C. AS

1493 Rouet-Mayer (M- A) and Philippon (J). Inhibition of catechol oxidases from apples by sodium chloride. **Phytochemistry** 25(12); 1986; 2717-2719

Apricots

1494 Andrich (G) and Fiorentini (R). Effects of controlled atmosphere on the storage of new apricot cultivars. **Journal of the Science of Food and Agriculture** 37(12); 1986; 1203-1208

The storage in refrigerated (0-0.5 C) and controlled atmospheres (5% Oxygen and 0-7.5% carbon dioxide) of fruit belonging to two new late-ripening cv. of apricots (ICAPI-17-COL and ICAPI-30-COL) has been studied to determine their storability and to examine the effect of the Carbon dioxide level on wt. decrease, firmness, total titratable acidity (TTA), pH, refractometric degree (RD) and physiological and pathological changes. Both cv., but particularly ICAPI-30-COL, proved suitable to store for up to 3 wk. under controlled conditions. Only for ICAPI-30-COL did the development during storage of some ripening parameters (firmness, TTA, pH and RD) seem to be related to carbon dioxide, concn. showing the importance of varietal influence. AS

Blueberries

1495 Bilyk (A) and Sapers (GM). Varietal differences in the quercetin, kaempferol, and myricetin contents of highbush blueberry, cranberry, and thornless blackberry fruits. **Journal of Agricultural and Food**

Chemistry 34(4); 1986; 585-588

Citrus

1496 Tonogai (Y), Ito (Y), Ogawa (S) and Iwaida (M). Determination of dibromochloropropane and related fumigants in citrus fruit. **Journal of Food Protection** 49(11); 1986; 909-913

A simple and systematic procedure for detn. of 1,2-dibromo-3-chloropropane (DBCP), 1,3-dichloropropene (DCP), chlorobutol (TCB) and seven related compounds in citrus fruits was established. Since these compounds have extremely high volatility, the distillation apparatus for volatile oil detn. was used. These compounds were trapped into cyclohexane (more than 94.2-98.4% at spiking levels of 0.5-50 p.p.m) by this distillation. The distillate was purified by Florisil column chromatography. All compounds except TCB were eluted with n-hexane:ether(93:7) and TCB was eluted with ether. Each eluate was injected into an ECD-gas chromatograph directly for detn. Their recoveries from lemon, orange and grapefruit were within 91.5-98.6% at the spiking levels of 0.01-1 p.p.m. AS

Lemons

1497 Hasegawa (S) and Herman (Z). Biosynthesis of limonoids: Conversion of deacetylnomilinate to nomilin in **Citrus limon**. **Phytochemistry** 25(11); 1986; 2573-2524

Radioactive tracer work showed that deacetylnomilinate was converted to nomilin in detached stems of young **Citrus limon** seedlings. This work and the previous findings suggest that deacetylnomilinate is the initial limonoid to be biosynthesized among the limonoids known to be present in **Citrus**. Possible biosynthetic pathways for the formation of limonoids in **Citrus** are proposed. AS

1498 Hasegawa (S), Herman (Z), Orme (Ed) and Ou (P). Biosynthesis of limonoids in citrus. Sites and translocation. **Phytochemistry** 25(12); 1986; 2783-2785

Sites of limonoid biosynthesis were located in **Citrus limon**. The stem was found to be the major site of nomilin biosynthesis from acetate. Epicotyl hypocotyl and root tissues were also capable of biosynthesizing nomilin from acetate, but leaves, fruits and seeds did not show this capacity under the conditions used. All the tissues tested were capable of biosynthesizing other limonoids starting from nomilin. **C. limon** was capable of translocating nomilin from the stem to other sites. AS

Grapefruits

1499 Hale (PW), Miller (WR) and Smoot (JJ). Evaluation of a heat-shrinkable copolymer film coated with imazalil for decay control of Florida grapefruit. **Tropical Science** 26(2); 1986; 67-71

Several fungicide treatments, including an experimental heat-shrinkable film coated with imazalil (1-[2-(2,4-dichlorophenyl)-2-(2-propenyloxy)ethyl)-1H-imidazole) (1M), were studied to evaluate effectiveness in controlling decay of wrapped and unwrapped seedless grapefruit (**Citrus paradisi** Macf.). The fruit were treated and stored for 4 wk at the recommended temp. based on time of harvest plus 1 wk at 21.1 C and at 85-92% relative humidity. Results showed that 1M-coated film offered no great advantage for preventing decay over other fungicide applications such as incorporating thiabendazole (2-(4 Thiazolyl)-benzimidazole) (TBZ) in wax, or spraying the fruit with TBZ or 1M prior to waxing or wrapping the fruit with untreated film. AS

1500 Krause (M), Loubser (JT) and de Beer (PR). Residues of aldicarb and fenomiphos in soil, leaves, and fruit from a treated vineyard. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 717-720

Residues of aldicarb and fenomiphos in the roots, stems, leaves, fruits and soil from vineyard treated with adicarb (5 kg/ha) and fenomiphos (20 kg/ha) were determined by GC. No residues of TA or TF were present in any of the samples taken before treatment. No TA residues were found in the soil samples tested after 28 days. TF residues were found in the 30-60 cm layer. Inspite of it, all fruit samples contained less than 0.01 mg/kg of TA and 0.02 mg/kg of TF on harvesting. OES

Grapes

1501 Sharma (RC) and Dharam vir. Post-harvest diseases of grapes and studies on their control with benzimidazole derivatives and other fungicides. **Pesticides** 20(9); 1986; 14-15

Treatment of grapes with carbendazim and thiabendazole and wrap treatment with VFI paper checked infection of **Aspergillus niger** and extended the shelf life. Aureofungin, panactin and 2, 4-D were effective against **Alternaria alternata**. BV

Melons

Muskmelons

1502 Cohen (R A) and Hicks (JR). Effect of storage on quality and sugars in muskmelon. **Journal of the American Society for Horticultural Science** 111(4); 1986; 553-557

Melons (**Cucumis melo**) of 3 cv. ('Gold Star', 'Saticoy', and 'Superstar') were stored at 5 or 12.5 C for 2, 5, or 9 days and at 20 C for 2 and 5 days, 'Gold Star' and 'Superstar' deteriorated less in storage than 'Saticoy'. In general, levels of fructose and glucose decreased with an increase in storage time and temp. The fructose : glucose ratio increased with storage. No change was detected in soluble solids content (SSC) or in sucrose concn. Sensory evaluations of stored (7 days at 4 or 12.5 C) vs. freshly harvested melons showed no difference in texture, flavour, off-flavour, sweetness, or overall acceptability. SSC and sucrose content correlated well with the latter 4 attributes only in 'Gold Star' melons. AS

Papaya

1503 Hartmann-Schreier (J) and Schreier (P). Purification and partial characterization of Beta-glucosidase from papaya fruit. **Phytochemistry** 25(10); 1986; 2271-2274

Beta-Glucosidase (I) was isolated from **Carica papaya** fruit pulp and purified Ca 1000-fold to electrophoretic homogeneity. The procedure used ammonium sulphate fractionation followed by chromatography on Phenyl Sepharose CL-4B and Sephacryl S-200 to separate Alpha-mannosidase (II) and, in part, Beta-galactosidase (III) from (I). Final separation of (III) from (I) was achieved by preparative isoelectric focusing (PIEF). The glycosidases had pI of 5.2 (I), 4.9 (II) and 6.9 (III), M s of 54 000 (I), 260 000 (II) and 67 000 (III) were determined by gel filtration. The M of (I) estimated by SDS-PAGE was

27 000 suggesting that (I) consisted of two subunits. The optimum pH and optimum temp. of (I) were 5.0 and 50 C, respectively, and the enzyme followed typical Michaelis kinetics with K_m and V_{max} of 1.1 x 10^{-4} M and 1.8 x 10^{-4} mol./h, respectively for P-nitrophenyl-Beta-D-glucoside (40 C). AS

1504 McKee (RA) and Smith (H). Purification of proteinases from Carica **papaya. Phytochemistry** 25(10); 1986; 2283-2287

A method is detailed for the fractionation and purification of cysteine proteinases from the latex of Carica papaya. The main advantages of this method are its ability to resolve complex mixtures based on small differences in the isoelectric points of the individual components, the amount of soluble material (ca 500 mg) which can be loaded, with quantitative recovery, and, unlike other high resolution analytical techniques, the lack of need for expensive equipment. The profile of proteinases is compared between unprocessed dried latex and fresh non-fruit latex, and possible reasons for the observed differences are discussed. MVG

CONFECTIONERY, STARCH AND SUGAR

Confectionery

1505 Richardson (T). ERH of confectionery food products. **Manufacturing Confectioner** 66(12); 1986; 85-89

1506 Thorz (MS). Extruding: Cooling and cutting technology as applied for the processing of confectionery products. **Manufacturing Confectioner** 66(11); 1986; 57-61

1507 Von Elbe (JH). Measurement of water activity in confections. **Manufacturing Confectioner** 66(11); 1986; 51-52, 54-56

1508 Wainwright (R). Cocoa butter alternative fat systems for compound and pastel coating. **Manufacturing Confectioner** 66(11); 1986; 45-49

Sugar

1509 Soni (PL) and Anuradha Agarwal. Carbohydrates from biomass in the prespective of tomorrow's chemical industry. **Indian Sugar** 36(8); 1986; 405-413

BAKERY PRODUCTS

Bread

1510 McKenzie-Parnell (JM) and Davies (NT). Destruction of phytic acid during home breadmaking. **Food Chemistry** 22(3); 1986; 181-192

The loss of phytate in home-made proprietary yeast bread mixes was less in brown (22-58%) than in white (67-90%) mixes. Since the initial phytate content was higher (0.36-0.52 g phytic acid/100 g DM), the brown loaves contained more phytate in the final product than did the white loaves (0.22-0.52 g compared with 0.01-0.06 g phytic acid/100 g DM). Bread made from conventional ingredients and 100% wholemeal flour lost 30-48% phytate during making and contained 0.52-0.71 g phytic acid/100 g DM. White bread made from conventional ingredients lost all of the initially low amount of phytate present. Phytate was lost at all stages of making (mixing, kneading, proving and baking). Very little phytate was lost in unleavened wholemeal breads made from a proprietary mix or from conventional ingredients. AS

Chapathies

1511 Narayan Prasad (N), Santhanam (K) and Rama Rao (MV). Protein quality of chapathies preserved with sorbic acid and stored for six months. **Journal of the Science of Food and Agriculture** 39(1); 1987; 73-77

The food consumed and wt. gained by the animals fed preserved chapathies were significantly lower than the corresponding values of the fresh chapathi groups. However the PER and Feed efficiency ratio (FER) values did not show any difference, hence it is concluded that the preservation treatment has no effect on the protein quality of chapathies. KAR

MILK AND DAIRY PRODUCTS

1512 Gupta (SK) and Patel (AA). Natural and synthetic food flavourings for dairy and food industry. **Indian Dairyman** 39(3); 1987; 101-107

Descriptions, properties, characteristics and uses of flavours which include: single chemical compounds giving characteristic flavour; vanilla flavouring; fruit flavourings including orange oil extract and sugar-free fruit flavours; spices and related flavourings; chocolate flavourings; caramel; cultured butter and cheese flavourings; flavour emulsion and fixations; and flavour enhancers and potentiators. KMD

Milk

1513 Abbar (FM), Tahir Mohammed (M) and Arslain (SH). Selected biological properties of enterotoxigenic staphylococci isolated from milk. **Journal of Food Protection** 49(11); 1986; 871-873

A total of 79 strains of staphylococci isolated from milk of mastitic cows in different Ninevah localities was divided into three groups based on biochemical activity. Group A was classified as **Staphylococcus aureus**. The resistance of these strains to antibiotics was: penicillin, 47.17%, streptomycin, 20.75%; erthromycin, 9.43%; and chloramphenicol, 5.66%. Most of the strains were resistant to the international phage set but were sensitive to phages 78 and 102 of the bovine phage set. Five strains produced enterotoxin C and two strains produced enterotoxin D. AS

1514 Andrews (GR). Formation and occurrence of lactulose in heated milk. (Review). **Journal of Dairy Research** 53(4); 1986; 665-680

1515 Andrews (GR). Effect of storage, light and homogenization on the colour of ultra heat treated and sterilized milk. **Journal of Dairy Research** 53(4); 1986; 615-624

The rates of change in light reflectance and in CIELAB tristimulus colour values were compared for direct and indirect ultra heat treated (UHT) and sterilized milk in glass and polyethene bottles stored under different conditions. The rate of change of milk reflectance was higher at shorter wavelengths and the milk colour changed more rapidly at 30 and 37 C than at room temp. Sterilized milk in polyethene bottles was bleached when stored in an illuminated cabinet. The colour of skimmed milk changed more rapidly than that of whole milk. The rate of change in reflectance of direct UHT milk above 590 nm was found to be higher than in other milks. A statistical interaction was found between the fat content and the storage temp. for the CIELAB values. The homogenization pressure used in processing UHT milk samples did not affect the rate of change of the milk colour. The main implication of these findings may be that milk colour cannot be used to assess the heat treatment of a milk when the age or storage conditions of the milk are unknown. AS

1516 Bories (GF), Baradat (MM) and Corpet (DE). Bioautographic method for evaluation of glycopeptide actaplanin in milk. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 938-940

1517 Donnelly (WJ), Carroll (DP), O'Callaghan (DM) and Walls (D). Genetic polymorphism of bovine chymosin. **Journal of Dairy Research** 53(4); 1986; 657-664

1518 Grufferty (MB) and Fox (PF). Potassium iodate-induced proteolysis in ultra heat treated milk during storage: The role of Beta-lactoglobulin and plasmin. **Journal of Dairy Research** 53(4); 1986; 601-613

The objective of the study was to identify the enzyme involved and the mechanism by which potassium iodate induces proteolysis in UHT-treated milk during storage. Results showed that plasmin is the enzyme involved in potassium iodate induced proteolysis. The reaction mechanism probably involved oxidation of the SH group of Beta-lactoglobulin which became available on denaturation and oxidation prevented thiol-disulphide into change between plasmin and denatured Beta-lactoglobulin which would otherwise inhibit enzyme activity. MVG

1519 Gupta (SK) and Patel (GR). Recent advances in processing of milk and milk products. **Indian Dairyman** 39(3); 1987; 129-133

This brief review covers: raw milk preservation by thermization (heating to 62-65 C for 10-20 s) or by chemical preservation using the lactoperoxidase/thiocyanate hydrogen peroxide system; UHT processing of milk; microwave processing of milk; technology of cheese making; butter and fat-rich products; indigenous dairy products; and energy conservation. KMD

1520 Larocque (L) and Neville (GA). A practical evaluation of the Delvotest P multi plate test in screening raw milk for antibiotics. **Journal of Food Protection** 49(11); 1986; 868-870

The Delvotest P multi plate test was evaluated by screening 100 milk samples for total antibiotic residues (penicillin G, streptomycin and neomycin). The samples were taken in conjunction with an antibiotic depletion study in milk derived from six cows treated with a multiple antibiotic, intramammary infusion product. Within the limits of sensitivity of the Delvotest, only penicillin G persisted in milk samples taken beyond 60 h, whereas in some samples, the other antibiotics appeared to be depleted as early as 48 h. More sensitive tests, however, detected neomycin (Staphylococcus **epidermidis**, ATCC 12228) in 50% of samples taken at 60 h and streptomycin (**Bacillus subtilis**, ATCC 6633) at 14.5 d after discontinuation of infusion. AS

1521 Lynch (MJ), Mosher (FR), Brunner (LA) and Bartolucci (SR). Liquid chromatographic determination and identification of morantel-related residues as precursors of 3-(3-methyl-2-thienyl) acrylic acid (CP-20,

107) in bovine milk. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 931-935

1522 Lynch (MJ), Mosher (FR), Dimmock (ME), Brunner (LA), Babcock (WE), McManus (RF) and Wheelhouse (RK). Determination of depletion and statistical distribution of morantel-related residues in bovine milk following administration of morantel tartrate to dairy cows. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 935-938

1523 Mathur (ON) and Sujatha (B). Some properties of soured and de-acidified buffalo's milk-mineral composition. **Journal of Food Processing and Preservation** 10(1); 1986; 47-55

The influencing of passing electric current in the acidic buffalo milk with a view to explore the possibility of retaining and utilizing such milk for the manufacture of dairy products was studied. It was found that the average heat coagulation time for normal milk, acidic milk and de-acidic milk was 42.66 ± 1.40, 2.74 ± 0.03, 44.41 ± 1.78 min resp. The average pH of these milks were 6.72 ± 0.19, 6.21 ± 0.02 and 6.77 ± 0.03, respectively. The soluble Ca in different types of whey obtained from whole milk, acidic milk and deacidified milk were 24.03%, 33.11%, and 21.37%, respectively. Similarly Mg contents were 56.78%, 66.56% and 56.61% and the phosphate contents were 43.87%, 60.74%, and 42.24% and citrate 67.93%, 81.48% and 62.16%. KAR

1524 Okello-Uma (I) and Marshall (VME). Influence of mastitis on growth of starter organisms used for the manufacture of fermented milks. **Journal of Dairy Research** 53(4); 1986; 631-637

The effect of milk containing increased somatic cells on the starter organisms **Streptococcus thermophilus, Lactobacillus bulgaricus** and **L. acidophilus** was examined. Increased somatic cell count resulted in stimulation of **Str. thermophilus** owing to increased proteolysis, but inhibition of L. **acidophilus** as a consequence of increased phagocytic activity of the polymorphonuclear leucocytes. AS

1525 Schaar (J) and Funke (H). Effect of subclinical mastitis on milk plasminogen and plasmin compared with that on sodium, antitrypsin and N-acetyl-Beta-D-glucosaminidase. **Journal of Dairy Research** 53(4); 1986; 515-528

The aim of this investigation was to study the plasminogen transport into milk and the relationship between plasmin and proteinase inhibitors which occur simultaneously in mastitic milk. This was done by comparing levels of plasminogen and plasmin in milk from healthy and but chemically infected mammary glands with levels of some other milk components like. Na, antitrypsin and the lysosomal enzyme N-acetyl-Beta-D-glucosaminidase (Na Gase). Results suggested that plasmin contributes to Na leakage into milk by degrading membrane proteins of epthelilal living plasmin and antitrypsin was not identically affected by stage of lactation indicating non identical modes of transport from plasma to milk. MVG

1526 Wahlgren (M), Drakenberg (T), Vongel (HJ) and Dejmek (P). 31P-nuclear magnetic resonance study of milk fractions. **Journal of Dairy Research** 53(4); 1986; 539-545

P-nuclear magnetic resonance 31p -NMR was used to examine milk serum, whey and milk ultrafiltrate. Resonances in the sprectra appeared for about 20 phosphorylated milk constituents most of which have been assigned to milk constituents as inorganic phosphate, N-acetylglucosamine - 1-phosphate and glycerophosphorylcholine. Some unknown constituents like phosphocreatine were also observed for resonance. It was found that the resonance inorganic phosphate overlapped that of N-acetylglucosamine - 1-phosphate which possibly explains the reason for this constituent not being observed earlier in ^{31}pNMR studies of milk. MVG

1527 Zaida (AH), Sarma (SC), Grover (PD) and Heldman (DR). Milk concentration by direct contact heat exchange. **Journal of Food Process Engineering** 9(1); 1986; 63-79

Milk was concentrated from 9% T.S. to 50% T. S. in batches by direct injection of hot air/nitrogen. The rates of evaporation were found satisfactory. Process was found energy efficient with thermal economy of 1.49 which approximates to that of a double effect evaporator. Inspite of high gas temp. (120 - 140 C) the bulk temp. of milk did not exceed 40 C which is advantageous from a nutritional view point. Lower processing temp. did not adversely affect the bacterial growth and it remained within permissible limit. AS

Milk products

1528 Keshava (N), Venkatasubbaiah (P) and Dwarakanath (CT). Microbial evaluation of milk based sweets and butter. **Arogya** 13(1); 1987; 55-58

Thirty five samples of milk-based sweets and 10 samples of butter sold in local market at Mysore were analysed for microbial indices like aerobic mesophiles, yeast, molds, enterobacteria, enterococci, **B. cereus, Staph. aureus** and **Cl. perfringens**. About 38.1% and 20% of samples respectively of sweets and butter showed aerobic mesophile count less than 30,000 cfu./g. Zero and 20% of them respectively had yeast and mould count less than 10 cfu/g. Of the sweet samples 45.5%, 33.3% and 4.4% were respectively free from enterobacteria, enterococci and **Cl. perfringens**. Over 50% milk-based sweets contained **B. cereus** over 10^4 cfu/g; all of them had **Staph. aureus** in the range of 10^3 to 10^5 gm. Among butter samples 40% contained enterobacteria over 10^2 g. and **B. cereus** above 10/g; 80% contained **Staph. aureus** over 10^2 g. AS

Cheese

1529 Fernandez-Salguero (J), Alcala (M), Marcos (A) and Esteban (MA). Measurement and calculation of water activity in blue cheese. **Journal of Dairy Research** 53(4); 1986; 639-644

Water activity, pH, and several chemical components were determined in 20 samples of Blue cheese belonging to the varieties Bleu de Bresse, Cabrales, Danablu, Edelpilzkase, Gorgonzola and Roquefort. The water activity in these cheeses could be calculated from chemical data on a water content basis (g/100 g water) by two simple equations. Water activity = 1.0013-0.0051 (ash)-0.0056 (SN), Water activity = 0.9808-0.0058 (ash), where SN is the soluble nitrogen. Differences between calculated and measured water activity using these relationships were similar to these obtained with a more complex equation described by Ruegg & Blanc (1983). AS

1530 Grandison (AS) and Ford (GD). Effects of variations in somatic cell count on the rennet coagulation properties of milk and on the yield, composition and quality of cheddar cheese. **Journal of Dairy Research** 53(4); 1986; 645-655

Cheddar cheeses were prepared from low somatic cell count (SCC) milks and from milks containing 10, 20 and 30% added high SCC milk to give modestly elevated SCC. Increased SCC in the milk were associated with a reduction in the coagulum strength and an increase in moisture content of the cheeses. Cheese texture was affected significantly as judged both by the findings of an assessment panel and by instrumental physical measurement. The panel scores for flavour were also slightly altered. It was concluded that even a small increase in SCC is detrimental to cheese composition and quality, although no significant effects on yield were detected. Relationships between cheese yield, composition and properties, coagulation properties and composition of the milk were also studied. Yield was related to the total solids and fat in the milk but not to the coagulation properties or the flavour or texture of the cheeses. Coagulum strength, cheese composition and cheese texture were strongly interrelated. AS

1531 Jameson (GW). Dietary cheeses - low fat, low salt. **CSIRO Food Research Quarterly** 46(3); 1986; 64-68

Considers the methods of reducing the sodium and fat levels in cheese; the potential for low-fat and low-salt cheeses in the Australian market and changes in relevant Australian food regulations. BV

1532 Trucksess (MW) and Page (SW). Examination of imported cheeses for aflatoxin. M1. **Journal of Food Protection** 49(8); 1986; 632-633

Ice cream

1533 Mittal (GS) and Parkin (KL). Transportation of frozen food in insulated containers-Theoretical and experimental results. **Journal of Food Process Engineering** 9(1); 1986; 81-92

A study was conducted on the ability of two insulated containers to maintain the low temp. of ice cream in an ambient environment. A mathematical model was solved using Continuous System Modeling Program (CSMP) and finite difference technique to predict the temp. distribution in the product with time. The model predicted the temp. profiles within ± 5% of the experimental data. AS

Whey

1534 Slack (AW), Amundson (CH) and Hill (CGJr). Production of enriched Beta-lactoglobulin and Alpha-lactalbumin whey protein fractions. **Journal of Food Processing and Preservation** 10(1); 1986; 19-30

This is a process based on (1) 90% volume reduction of whey by ultrafiltration, (2) partial demineralization of the UF retentate by electrodialysis or diafiltration, (3) pH adjustment of the UF retentate before and after demineralization to pH 4.65, and (4) centrifugation of the retentate produced Beta-lactoglobulin-enriched fractions containing 33% of the original acid whey protein and 17% of the original sweet whey proteins. Lactose and ash impurities in the Beta-lactoglobulin-enriched fraction were reduced by 18% by resuspending the pellet in distilled water at pH 4.65 and recentrifuging. Diafiltration of the Alpha-lactalbumin-enriched fraction with 2, 4 and 6 volumes of distilled water reduced the lactose and ash content of this fraction by 53%, 62% and 81%, respectively. Gel electrophoresis patterns of the two protein enriched fractions confirmed selective enrichment of Beta-lactoglobulin or Alpha-lactalbumin in each fraction. AS

1535 Stock (R), Klopfenstein (T) and Brink (D). Whey as a source of rumen-degradable protein. II: For growing ruminats. **Journal of Animal**

Science 63(5); 1986; 1574-1580

1536 Stock (R), Klopfenstein (T), Brink (D), Britton (R) and Harmon (D). Whey as a source of rumen-degradable protein. I. Effects on microbial protein production. **Journal of Animal Science** 63(5); 1986; 1561-1573

Yoghurt

1537 Hart (JW). Preservative free and low fat yoghurt. **IFST Proceedings** 19(4); 1986; 144-150

Manufacture of low fat yoghurt without preservatives is discussed. BV

Milk proteins

Casein

1538 Anderson (M), Moore (C) and Griffin (MCA). Effect of heat treatment on casein micelle profiles obtained by controlled pore-glass chromatography. **Journal of Dairy Research** 53(4); 1986; 585-593

Casein

1539 Britten (M), Boulet (M) and Paquin (P). Composition and interfacial properties of casein micelle fractions. **Journal of Dairy Research** 53(4); 1986; 573-584

Casein micelles in a reconstituted bovine skim milk were dissociated by dialysing them against various concn. of EDTA. Gel chromatography showed a gradual but limited dissociation when micellar Ca was chelated and two main fractions were isolated. Monolayer technique and gel electrophoresis were used to characterize the interfacial properties and composition of the fractions. The first fraction contained highly cohesive complexes that did not unfold at the air-water interface. From Pi-A isotherms the close-packing area (A_o) was 0.08 m^2 mg^{-1} and was related to an average particle diameter of 9.1 nm k-Casein was concentrated in this fraction in an equimolar ratio with Beta-caseins and a variable ratio with Alpha-casein (0.55-1.10). These particles are thought to represent submicelles. The complexes of the second fraction were easily disrupted and spread out at the interface like casein monomers, with a close-packing area of 1.05 m^2 mg^{-1}. Two different complexes were identified in this last fraction. One of them contained an approximately equimolar ratio of Alpha$_s$ and Beta-caseins, and the other was composed exclusively of Alpha$_s$-casein. The results are discussed in relation to casein interactions leading to micelle formation. AS

1540 Carles (C) and Ribadeau-Dumas (B). Determination of gradient elution conditions for the separation of peptide mixtures by reversed-phase high-performance liquid chromatography. Bovine Beta-casein tryptic digest. **Journal of Dairy Research** 53(4); 1986; 595-600

Taking as an example a tryptic hydrolysate of bovine Beta-casein, it was shown that the method used for the detn. of optimal elution conditions for isocratic systems also applied to the separation of complex peptide mixtures by reversed-phase high-performance liquid chromatography with linear gradients. Using a C18 column and the same solvents, successive studies of the influence of flow rate, pH and temp. allowed a satisfactory separation of the sample in less than 30 min. Valuable information on the specificity of the action of trypsin on Beta-casein was deduced from the yield of the eluted peptides. AS

1541 Hill (SHA) and Gasson (MJ). A qualitative screening procedure for the detection of casein hydrolysis by bacteria, using sodium dodecyl sulphate polyacrylamide gel electrophoresis. **Journal of Dairy Research** 53(4); 1986; 625-629

Incubation of bacteria with casein at 30 C (pH 7.2) resulted in the formation of a number of peptide fragments. The peptides were separable when subjected to electrophoresis. A proteinase-positive strain of **Streptococcus lactis** preferentially hydrolysed the Beta-casein moiety of whole casein, and after incubation for 5 min produced a characteristic pattern of four peptides on sodium dodecyl sulphate (SDS) polyacrylamide gels. After 30 min incubation only one peptide remained. This single polypeptide was then further hydrolysed to produce one (60 min) and eventually two (120 min) lower mol. wt. peptides. Hydrolysis was generally complete after about 480 min. Two proteinase-negative variants of this strain did not hydrolyse casein. Crude proteinase preparations gave the same characteristic peptide patterns. SDS-polyacrylamide gel electrophoresis was used to screen more proteinase-positive strains of **Str. lactis** for casein hydrolysing activity. Of those so far tested all produced the same peptide patterns from Beta-casein. Proteinase negative variants of all these strains did not hydrolyse casein. AS

1542 Holt (C), Thomas Davies (D) and Law (AJR). Effects of colloidal calcium phosphate content and free calcium ion concentration in the milk serum on the dissociation of bovine casein micelles. **Journal of Dairy Research** 53(4); 1986; 557-572

1543 Ono (T) and Takagi (T). Molecular weights of subunit components of bovine casein micelles. **Journal of Dairy Research** 53(4); 1986; 547-555

Sephacryl S-300-GC or TSK-G4000 SW gel chromatography (TSK-GC) was used to elute the larger of the two casein micelles (F-2) at the same retention time irrespective of sample concn. and column temp. Its mol. wt. was estimated to 500K by examining the eluate from TSK-GC using low angle laser light scattering photometer and precision differential refractometer. With the second component (F3) retention time in S300-GC was significantly affected by both sample concn. and volume applied. Limiting retention time for this constituents could be obtained by extrapolation of these two parameters to higher and lower values and corresponded to those of water soluble protein with mol. wt. 200 K and 100 K resp. This was confirmed by sedimentation equilibrium technique at the above limiting sample concn. S-300 GC at either low concn. or low column temp. resulted in a new components being eluted at a position of mol. wt. 25 K. MVG

MEAT AND POULTRY

Meat

1544 Buts (B), Casteels (M), Claeys (E) and Demeyer (D). Effects of electrical stimulation, followed by moderate cooking, on meat quality characteristics of veal **Longissimus dorsi**. **Meat Science** 18(4); 1986; 271-279

Influence of electrical stimulation (ES) on colour, water holding capacity (WHC) and tenderness under moderate cooking conditions was studied in three groups of male Freisian veal calves slaughtered in separate series. ES increased brightness and to a lesser extent yellowness of freshly cut steaks but also reduced WHC of the meat. Two of the three groups showed improvement in tenderness. The negative effect on the third group is possibly due to production of two opposite effects on tenderness-'toughening' as a result of sarcomere shortening which occured in all three groups, and tenderness as a result of microscopical fibre disruption. It was suggested that ES may out weigh advantages when followed by moderate cooking. MVG

1545 Crane (B) and Duganzich (DM). The effect of bone in meat samples upon analytical results for fat, protein and water by Foss Super-Scan Type 10600. **Meat Science** 18(3); 1986; 181-190

Possible interferences at fat, protein and water wavelength; of the super-scan (infrared meat analyses) due to absorbance by phosphorous at the carbohydrate wavelengths were analysed. Results showed super-scan can be used for the analysis of done-in-meat provided it is calibrated with standards of similar composition to the samples and the fat range restricted to no more than 15%. MVG

1546 Johnson (SK), White (WJP) and Lawrie (RA). Observations on the 3-methylhistidine content of bovine, ovine and porcine muscles. **Meat Science** 18(3); 1986; 235-239

The titres of 3-methylhistidine in bovine and ovine masseter/malaris muscles are similar to one another but low in relation to other skeletal muscles, whereas titres in porcine masseter/malaris resemble the latter. The process of mastication in bovines by masseter/malaris muscles appears to involve prolonged, slow action since the fibres are exclusively of type I. These 'red' fibres have very low titres of 3-methylhistidine in their myosin but normal values in their actin. AS

1547 Kauffman (RG), Eikelenboom (G), Van der Wal (PG), Merkus (G) and Zaar (M). The use of filter paper to estimate drip loss of porcine musculature. **Meat Science** 18(3); 1986; 191-200

1548 Krzywicki (K). Some observations on protein changes in washed myofibrils of bovine muscle. **Meat Science** 18(3); 1986; 215-233

1549 Unruh (JA), Kastner (CL), Kropf (DH), Dikeman (ME) and Hunt (MC). Effects of Low-voltage electrical stimulation during exsanguination on meat quality and display colour stability. **Meat Science** 18(4); 1986; 281-293

The effects of low-voltage stimulation (LVS) during exsanguination under moderate cooling conditions on meat quality and display colour stability. Dark indicated that LVS during exsanguination, coupled with relatively slow initial chilling, might be detrimental to muscle quality. MVG

Beef

1550 Allen Foegeding (E) and Larick (DK). Tenderization of beef with bacterial collagenase. **Meat Science** 18(3); 1986; 201-214

Collagenase produced by **Clostridium histolyticum** was added to raw steaks and steaks placed in bags in a water bath to 65 C. Tenderness was tested by analysis of Warner-Bratzler shear detn. curves. It was shown that addition of NaCl or a combination of Calcium chloride, NaCl and collagenase would cause equivalent tenderisation. The lack of sensitivity in the shear evaluation or an effect on the enzyme activity due to the meat environment. MVG

1551 Correale (KK), Savell (JW), Griffin (DB), Acuff (GR) and Vanderzant (C). Microbiological and sensory characteristics of beef loin steaks: Role of subcutaneous fat. **Meat Science** 18(4); 1986; 241-253

1552 Correale (KK), Savell (JW), Griffin (DB), Acuff (GR) and Vanderzant (C). Microbiological and sensory characteristics of beef loin steaks: Role of intramuscular fat. **Meat Science** 18(3); 1986; 161-172

1553 Jones (SDM), Tong (AKW) and Robertson (WM). The effects of carcass grade and sex on the lean content of beef carcasses. **Canadian Journal of Animal Science** 67(1); 1987; 205-208

1554 Kostenbader (KDJr) and Cliver (DO). Reactivation with pancreatin of coproantibody neutralized virus in ground beef. **Journal of Food Protection** 49(11); 1986; 920-923

1555 Saeed (T), Abu-Dagga (F) and Rahman (HA). Detection of pork and lard as adulterants in beef and mutton mixtures. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 999-1002

Detection of pork and lard in different beef and mutton mixtures was investigated. The extracted fat was hydrolyzed and esterified to methyl esters of fatty acids, which were then analyzed on a fused silica capillary column coated with FFA. Gas chromatographic analysis showed that 11, 14-eicosadienoic acid $C_{20:2}$ can be used as an indicator for the presence of pork or lard in beef and mutton mixture. $C_{20:}$ is not detected in beef or mutton and is present in pork and lard. Overall composition of the fatty acids can be used for rough estimation of sample composition. Using this method, a detection limit of 1% pork in beef and mutton was reached. AS

1556 Samejima (K), Fretheim (K) and Egelandsdal (B). Effects of electrical stimulation and ageing of beef on the gelation properties and protein extractability of isolated myofibrils. **Meat Science** 18(4); 1986; 295-306

Effect of electrical stimulation and post mortem storage (ageing) of beef on the heat indicated gelation properties of myofibrils subsequently isolated was studied. MVG

1557 Savell (JW), Griffin (DB), Dill (CW), Acuff (GR) and Vanderzant (C). Effect of film oxygen transmission rate on lean colour and microbiological characteristics of vacuum-packaged beef knuckles. **Journal of Food Protection** 49(11); 1986; 917-919

1558 Scriven (FM) and Singh (R). Comparison of the microbial populations of retail beef and pork. **Meat Science** 18(3); 1986; 173-180

Samples of beef mince, beef rumps, pork mince and pork rumps were microbiologically evaluated for total plate counts, coliforms, **Escherichia coli**, **Staphylococcus aureus**, **Salmonella** and **Trichinella spiralis**. For all samples total plate counts were similar. But populations of coliforms and **Staph. aureus** were higher in minced meats than in rumps. Higher loads of **Staph. aureus** were found in minced pork than other meats. **Salmonella** and **T. spiralis** were not detected in any sample. MVG

1559 Whiting (RC), Benedict (RC) and Cangialosi (M). Survival and outgrowth of **Clostridium sporogenes** spores during curing and storage of corned beef with reduced levels of sodium chloride. **Journal of Food Protec-**

tion 49(11); 1986; 874-876

Pork

1560 Cordray (JC), Huffman (DL) and Jones (WR). Restructured pork from hot processed sow meat: Effect of mechanical tenderization and liquid smoke. **Journal of Food Protection** 49(8); 1986; 639-642

1561 Jones (SDM), Tong (AKW) and Murray (AC). Effects of blast-chilling carcasses of different weight and fatness on the appearance of fresh pork. **Canadian Journal of Animal Science** 67(1); 1987; 13-19

The results indicate that blast-chilling carcasses resulted in fresh pork with a darker quality and slightly firmer structure than carcasses chilled in a conventional manner. MVG

1562 Usborne (WR), Menton (D) and McMillan (I). Evaluation of the Destron PG-100 electronic probe for grading warm pork carcasses. **Canadian Journal of Animal Science** 67(1); 1987; 209-212

The Destron PG-100 electronic grading probe was evaluated for prediction of lean yield, comparison with the ruler measurement, and precision on 204 pork carcasses representing equal numbers of barrows and gilts and a warm carcass wt. range of 56.8-111.4 kg. A complete cutout was done on the left side from each carcass to determine a regression equation for prediction of lean yield from the probe measurements of thickness of fat and muscle between the 3rd and 4th last rib, 7 cm off the mid-line. The Hennessy probe was used as the standard for this study. Both probes performed equally well when compared with the ruler measurement and in their ability to predict lean yield. AS

Bacon

1563 Canas (BJ), Havery (DC), Joe (FLJr) and Fazio (T). Current trends in levels of volatile N-nitrosamines in fried bacon and fried-out bacon fat. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 1020-1021

Commercially processed bacon samples purchased from the Washington, DC, retail market have been periodically analyzed since 1971 for the presence of volatile N-nitrosamines in the fried product. During that time, a downward trend in the concn. of N-nitrosopyrrolidine has been observed, and between 1978 and 1980 it plateaued at 4-30 ppb, with an average of 11 ppb. A recent survey, however, indicates a change in this downward trend, with N-nitrosopyrrolidine found at levels ranging from 1 to 65 ppb, average 21 ppb. Volatile N-nitrosamines were found at levels up to 110 ppb in the fried product and up to 85 ppb in the fried-out bacon fat. AS

Pigs

1564 Fortin (A). Development of backfat and individual fat layers in the pig and its relationship with carcass lean. **Meat Science** 18(4); 1986; 255-270

Swine

1565 Kauffman (RG), Eikelenboom (G), van der Wal (PG), Engel (B) and Zaar (M). A comparison of methods to estimate water-holding capacity in post-rigor porcine muscle. **Meat Science** 18(4); 1986; 307-322

Grace-Hamm and Braunsch Weiger-Gerat filter paper press techniques using five approaches of evaluation for each method:transmission per cent; swelling due to added water; centrifugation; 48 h fresh and cooked shrink; and inhibition of surface fluids accumulating on filter paper, were compared. Results indicate that most methods separated the three muscle types, **L. dorsi** from each of 28 porcine to its representing three distinct levels of water holding capacity i.e. dark, firm and dry; pale, soft and extractive (PSE); and normal (N). However, cooking loss tests failed to differentiate between PSE and N samples. The transmission, inhibition and pressed fluid methods did not always differentiate between DFD and N samples. Drip loss originating from size-standardised samples, swelling of homogenised samples by added water and absorption of surface fluids on filter paper appeared to be the most reliable methods. MVG

1566 Madden (RH), Hough (B) and Gillespie (CW). Occurrence of **Salmonella** in porcine liver in Northern Ireland. **Journal of Food Protection** 49(11); 1986; 893-894

Pork livers from four pork processing plants in Northern Ireland were studied to assess their contamination by salmonellae. Additionally, aerobic plate counts (APC) and counts of Enterobacteriaceae were made. One hundred twenty livers were samples immediately after evisceration and 110 sampled after being chilled overnight in the commercial premises. No salmonellae were detected. Geometric mean values for the APC were 1.6 x 10^4 and 3.1 x 10^5 CFU/g for fresh and chilled livers, respectively. Homologous geometric mean values for Enterobacteriaceae were 7.9 x 10^2 and 6.0 x 10^2 CFU/g, respectively. AS

Meat products

1567 Kokubo (Y), Matsumoto (M), Terada (A), Saito (M), Shinagawa (K), Konuma (H) and Kurata (H). Incidence of clostridia in cooked meat products in Japan. **Journal of Food Protection** 49(11); 1986; 864-867, 870

1568 Rayman (K), Weiss (KF), Riedel (G) and Jarvis (G). Microbiological quality of Canadian frozen meat pies. **Journal of Food Protection** 49(8); 1986; 634-638

One hundred and twenty samples of a variety of frozen meat pies were collected from 20 manufacturers across Canada and analyzed for aerobic colony count, coliforms, **Salmonella**, **Clostridium perfringens**, **Staphylococcus aureus** and yeasts and molds. **Salmonella** was not isolated from any of the pies and only low numbers of **Cl. perfringens** and **Staph. aureus** were found. The highest aerobic colony count, coliforms and yeasts and molds were observed in pies with uncooked pastry. The degree of contamination in these pies was not alarmingly high to warrant establishment of microbiological standards or guidelines for these products. AS

Sausages

1569 Nielsen (H-JS) and Zeuthen (P). Growth of spoilage bacteria in broth and vacuum-packed bologna-type sausage at fluctuating temperatures and low temperature storage. **Journal of Food Protection** 49(11); 1986; 886-890

Poultry

1570 Genigeorgis (C), Hassuneh (M) and Collins (P). **Campylobacter jejuni** infection on poultry farms and its effect on poultry meat contamination during slaughtering. **Journal of Food Protection** 49(11); 1986; 895-903

1571 Imai (C), Saito (J) and Ishikawa (M). Storage stability of liquid egg products. **Poultry Science** 65(9); 1986; 1679-1686

Pasteurized and unpasteurized liquid whole egg liquid yolk, and liquid white were stored at, and -3 C to determine their shelf life. In the pasteurized products stored at - 5 and - 3 C, the shelf life was considerably extended without adversely affecting functional properties. In the unpasteurized products stored at - 3 C, there was a slow growth of bacteria after freezing occurred. Pasteurization eliminated gram negative psychrophilic bacteria, and thus the pasteurized products can be stored well at low temp, whereas, in the unpasteurized products, the presence of psychrophiles significantly reduced the shelf life. The palatability and functional properties of the pasteurized egg products stored at -5 and -3 C for 50 days compared favourably with the same products before refrigerated storage. AS

1572 Pikul (J), Niewiarowicz (A) and Kupijaj (H). The cytochrome C content of various poultry meats. **Journal of the Science of Food and Agriculture** 37(12); 1986; 1236-1240

The levels of cytochrome C in the breast and thigh meat were: for chicken 11.4 and 35.5; for hens 14.0 and 84.2; for turkeys 13.1 and 47.4, for geese 141.0 and 107.8; for duckling 111.2 and 149.9 and for **Muscovy** ducks 81.5 and 97.3 μg/g of tissue respectively. KAR

Chickens

1573 Dockerty (TR), Scott-Kline (DL), Baker (RC), MacBride (MA) and Fishell (VK). Emulsification of chicken frankfurters manufactured by different production systems. **Poultry Science** 65(9); 1986; 1693-1701

Of the six systems tried those products manufactured under the three systems lacking an additional emulsification step did not develop satisfactory emulsions. Fat particles founded to be large and poorly dispersed. On the other hand, those systems incorporating additions emulsification resulted in emulsions with generally smaller fat globules well dispersed in the mixture. KAR

1574 Lyon (BG) and Lyon (CE). Surface dark spotting and bone discoloration in fried chicken. **Poultry Science** 65(10); 1986; 1915-1924

1575 Nagata (T) and Saeki (M). Liquid chromatographic determination of amprolium in chicken tissues, using post-column reaction and fluorometric detection. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 941-943

Broilers

1576 Janky (DM) and Salman (HK). Influence of chill packaging and brine chilling on physical and sensory characteristics of broiler meat. **Poultry Science** 65(10); 1986; 1934-1938

Chill packaging produced a significant toughening effect on light meat samples from water chilled carcasses. The effect was not observed in light meat samples from brine-chilled carcasses or in dark meat samples from water chilled carcasses. Chill packaging significantly decreased cooking loss, regardless of chilling treatment; however per cent moisture content of cooked meat was not affected by chill or packaging treatments. KAR

1577 Lyon (BG) and Hamm (D). Effects of mechanical tenderization with sodium chloride and polyphosphates on sensory attributes and shear values of hot-stripped broiler breast meat. **Poultry Science** 65(9); 1986; 1702-1707

Treating with Kena (a commercial mixture of sodium polyphosphates) received higher sensory scores, denaturing more tenderness, thickness, flavour and more favourable overall impression of the breast muscle than NaCl treated samples. All NaCl and Kena treated samples improved over the treated control (hot-stripped, tenderized, tumbled with deionized water). KAR

1578 Thomson (JE), Lyon (CE), Hamm (D), Dickens (JA), Fletcher (DL) and Shackelford (AD). Effects of electrical stunning and hot deboning on broiler breast meat quality. **Poultry Science** 65(9); 1986; 1715-1719

There was a significant stun by age interactions for pH and per cent wt. loss due to cooking. Breast meat from birds stunned prior to death exhibited higher pH 20 min postmortem than meat from nonstunned birds. Stunning had no effect on ultimate postmortem pH. Breast meat cooked 20 min postmortem exhibited significantly higher shear value, - it was less tender than meat cooked 24 h postmortem. Postmortem aging had a more pronounced effect on objective texture than electrical stunning. KAR

Turkeys

1579 Acuff (GR), Vanderzant (C), Hanna (MO), Ehlers (JG) and Gardner (FA). Effects of handling and preparation of turkey products on the survival of **Campylobacter jejuni**. **Journal of Food Protection** 49(8); 1986; 627-631

Poultry products

Eggs

Egg products

1580 Brown (ML), Holbrook (DM), Hoerning (EF), Legendre (MG) and St Angelo (AJ). Volatile indicators of deterioration in liquid egg products. **Poultry Science** 65(10); 1986; 1925-1933

Pasteurized, liquid egg products were allowed to deteriorate over a period of days. Products were periodically evaluated for odour and sampled for analysis of volatile components by combined purge and trap gas chromatography. Peaks were identified by mass spectrometry. In general, first detection of unacceptable odour in whole egg, albumen, or yolk samples was accompanied by the appearance of significant amounts of dimethyl sulphide. Concn. of dimethyl disulphide, dimethyl trisulphide, and ethanol increased on further deterioration of the products. AS

SEAFOODS

Fish

1581 Hatae (K), Tobimatsu (A), Takeyama (M) and Matsumoto (JJ). Contribution of the connective tissues on the texture difference of various fish species. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 52(11); 1986; 2001-2007 (Ja).

1582 Kojima (T), Sato (M), Yoshinaka (R) and Ikeda (S). Chemical components and fatty acid composition of lipids in several fresh water fishes except cyprinidae in Lake Biwa. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 52(11); 1986; 2009-2017

The fishes examined include **Silorus asotus, Salmo gairdneri, Oncorhynchus masourhodurus, Plecoglossus attivelis, Micropterus salmoides, Lepomis macrochirus, Arguilla japonica, Rhinogobius brunneus and Chaenogobius esaza.** The contents of moisture, crude ash, crude protein and crude lipid in edible portions were 68.3-84.6, 1.0-3.1, 12.1-22.5 and 1.2-16.2% respectively. Lipids of the edible portions were rich in palmitic acid, palmitoleic acid, and oleic acid. KAR

1583 Lebo (JA) and Smith (LM). Determination of fluorence in fish, sediment, and plants. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 944-951

1584 Niemann (RA). Surrogate-assisted determination of 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin in fish by electron capture capillary gas chromatograhy. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 976-980

1585 Schmidt (T), Richter (O) and Buning-Pfaue (H). Statistical analysis of biexponential decay curves. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 183(5); 1986; 325-330 (De).

Medication of trout and carps with chloramphenicol and sulphadimidine results in tissue residues which best fit by a biexponential decay curve. The analysis of residues does not reveal any systematic deviations of the data from the model. On the basis of this model half lives for the fast and slow drug elimination phases can be estimated. For the assessment of withdrawal times it is necessary to compute confidence limits for the decay curves. A withdrawal time may be defined by the intersection of recommended maximal concn. with the upper confidence limit. This analysis does not include any metabolites. This model is also suited for monitoring purposes. It is recommended to apply the procedure to all chemicals exhibiting biexponential decay kinetics. AS

1586 Ward (DR), LaRocco (KA) and Hopson (DJ). Adenosinetriphosphate bioluminescent assay to enumerate bacterial numbers on fresh fish. **Journal of Food Protection** 49(8); 1986; 647-650

The microbial quality of fresh fish was determined by using a bacterial ATP bioluminescent assay. Assay procedures included differential filtration followed by enzymatic degradation of somatic ATP. This technique limited interference from non-bacterial ATP sources and thus bacterial ATP was quantitated by using the lucifenn-luciferase reaction in an automated luminometer. Good correlation (r = 96) was obtained from four species of finfish when microbial counts, determined from ATP analyses, were compared to counts determined by using conventional plate count procedures. AS

Carp

1587 Okada (T), Inoue (N) and Shinano (H). An explanation of freeze denaturation on the kinetics of thermal inactivation of frozen-stored carp myosin B. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 52(10); 1986; 1765-1770

It is concluded from the findings that a portion of F-actin in carp myosin B which was frozen and stored in the range of - 3 approximate equal to - 10 C, was denatured as a result of the exposure to concentrated KCl solution; made this range, a lower temp. that is a higher KCl concn. had an accelerating effect on the denaturation of the F-actin. KAR

Hake

1588 Koning (AJde), Milkovitch (S) and Mol (TH). The origin of free fatty acids formed in frozen cape hake mince (**Merluccius capensis**, Castelnau) during cold storage at -18 C. **Journal of the Science of Food and Agriculture** 39(11); 1987; 79-84

Hake mince was stored at -18 C and samples were withdrawn at intervals during a 300-day period. The extracted lipids were examined for free fatty acid (FFA) and phosphorous (P) contents. It was found that FFA originated from both phospholipids and neutral lipids and after an initial required surge of FFA formation from both sources the rates declined and virtually became constant. The results for the cape hake are compared with literature data of the Atlantic cod and the Baltic herring. KAR

Sardines

1589 Ababouch (L), Alaoui (MM) and Busta (FF). Histamine levels in commercially processed fish in Morocco. **Journal of Food Protection** 49(11); 1986; 904-908

1590 Quaglia (GB) and Orban (E). Influence of the degree of hydrolysis on the solubility of the protein hydrolysates from sardine (**Sardina pilchardus**). **Journal of the Science of Food and Agriculture** 38(3); 1987; 271-276

The influence of different degrees of hydrolysis on the solubility of sardine proteins and on its correlation with the mol. wt. distribution of the protein hydrolysates was examined. All the hydrolysates showed high solubility with a more pronounced reduction for products with a lower degree of hydrolysis in acid pH at both high and low ionic strength. Furthermore, from the gel-chromatographic analysis, a decrease was noted in the high mol. wt. fraction as the degree of hydrolysis increased. AS

1591 Quaglia (GB) and Orban (E). Enzymic solubilisation of proteins of sardine (**Sardina pilchardus**) by commercial proteases. **Journal of the Science of Food and Agriculture** 38(3); 1987; 263-269

Enzymic hydrolysis represents a valid method for recovering proteins from by-products and surplus of the food industry, by protein solubilisation. In view of the economic interest in recovering of protein from poorly utilised species of fish, screening of some commercially available proteolytic enzymes: alcalase, papain and neutrase, was undertaken in order to test the most suitable one for the substrate employed. From the results, it can be concluded that alcalase and papain, at optimum pH and temp. conditions have significant effects on the nitrogen recovery from sardines, giving hydrolysates of high nutritional value and characterised by high solubility. AS

1592 Riaz (M), Fatima (R) and Qadri (RB). Biochemical changes during the preparation of fish sauce using sardines. **Tropical Science** 26(4); 1986; 213-222

The biochemical changes occurring during the preparation of fish sauce on an experimental scale in the laboratory and its manufacture on a semi-pilot plant scale is presented. Results indicated that the max. vol. of sauce was produced after 80 days and the proteolysis continued to occur until 160 days when about 50% of the insoluble fish protein had been hydrolysed into soluble form. The salt concn. and pH remained approx. constant throughout at 27-28% and 5.5-5.6 resp. The colour and strong cheesy aroma was noticed during preparation. In both laboratory and semi-pilot plant preparations, the total soluble N increased with time and reached a max. after 4 months. The aroma in semi-pilot plant preparations was less cheesy than in laboratory experiments. BV

Tunas

1593 Kanoh (S), Suzuki (T), Maeyama (K), Takewa (T), Watabe (S) and Hashimoto (K). Comparative studies on ordinary and dark muscles of tuna fish. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 52(10); 1986; 1807-1816

The ordinary and dark muscles of albacore, yellowfin and skipjack tunas were examined for protein composition, along with the contents of myoglobin (Mb), and ATP and related compounds. The stroma protein and Mb contents were around 5 and 10-40 times, respectively, higher in the dark than in the ordinary muscle in the three fishes. The K value, a parameter of freshness, of the dark muscle was 3-14 times higher than that of the ordinary muscle in every analyzed specimen. The proportions of collagen to elastin in connective tissues were fairly constant regardless of the species and the part of the muscle 88-98: 2-12. AS

Oysters

1594 Abeyta (CJr), Kaysner (CA), Wekell (MM), Sullivan (JJ) and Stelma (GN). Recovery of **Aeromonas hydrophila** from oysters implicated in an outbreak of foodborne illness. **Journal of Food Protection** 49(8); 1986; 643-646, 650

Shrimps

1595 Schulz (H). Determination of indole and skatole in sea food by high-performance liquid chromatography (HPLC). **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 183(5); 1986; 331-334 (De).

A rapid and specific high-performance liquid chromatographic (HPLC) method for the detn. of indole and 3-methylindole (skatole) is described. The detection limit of the two compounds is approx. 0.02 mg/kg. Gas chromatographic-mass spectrometric (GC-MS) confirmation of the identity has been carried out in shrimps. About 95% of added indole was recovered. The indole formation in shrimps, herring, and turbot, held under different storage conditions, is compared with other common quality indices such as TBA-value and alpha-tocopherol content. AS

PROTEIN FOODS

Infant foods

1596 Mitchell (GV) and Grundel (E). Nutritional value of proteins in powdered infant formula: In vitro and In vivo methods. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 650-653

The use of in vitro methods to predict the nutritive value of the proteins in powdered soy based and milk based infant formulas was investigated. A comparison of the in vitro digestibility as measured by a single pH equation and the in vivo rat digestibility of several infant formulas indicated that the in vitro method under estimates the digestibility of the formulas. Both soy based and milk based formulas were kept stored for one month at various humidities, and the humidity related nutritional damage was assayed by enzymatic apparent digestibility, dye bound lysine and relative digestion rate methods. Though the methods showed qualitative similarities in some cases, agreement among the assays was generally poor. The data suggest a lack of accuracy of the in vitro methods to evaluate the protein nutritional quality of any food. OES

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Beer

1597 Braitinger (M). General aspects in microbrewing. **Technical Quarterly, Master Brewers Association of America** 23(3); 1986; 100-103

1598 Hawley (JS). Mechanical refrigerator car shipment of beer in bulk. **Technical Quarterly, Master Brewers Association of America** 23(3); 1986; 104-109

Shipment of product in bulk is discussed. The system used consisted of fifty mechanical refrigerator cars for transportation under controlled temp., a shipping station with car cleaning capability and receiving stations at the plants where required. The system enables packaging, of the product of high flavour quality and physical stability in bulk shifting. MVG

1599 Imanishi (M). PET containers for beer. **Technical Quarterly, Master Brewers Association of America** 23(3); 1986; 73-75

The use of PET contains for beer on the basis of experiences of sensory are discussed. The wall thickeness of the container should be increased to reduce oxygen ingress and carbon dioxide loss. PET bottle can be formed more freely than glass or metals and the best shape is spherical for flavour and carbon dioxide retention. As the small volume container has a different oxygen gas barrier than large volume one, special attention should be paid to container design. MVG

1600 Taylor (JRN) and Boyd (HK). Free Alpha-amino nitrogen production in sorghum beer mashing. **Journal of the Science of Food and Agriculture** 37(11); 1986; 1109-1117

Breweries

1601 Bland (JL) and Fahrer (ND). Identifying and preventing organic deposits in brewery pasteurizers. **Technical Quarterly, Master Brewers Association of America** 23(3); 1986; 81-88

Hops

1602 Lam (KC), Foster (RTII) and Deinzer (ML). Aging of hops and their contribution to beer flavour. **Journal of Agricultural and Food Chemistry** 34(4); 1986; 763-770

Two American hop var., Cascada and Hallertaues mittelfruh were chosen for this aging study on beer quality. It was found that moderate aging of fresh hops prior to brewing was needed to maximize the levels of the various aroma compounds. However excessive aging also led to a significant loss in these compounds. The loss was more severe in Cascade than in Hallertauer hops. Geraniol, linalool and citronelloe were mainly responsible for the floral/cetral flavour, while the oxidation products of L-humulene especially humulenol II and humulene diepoxides contribute to the herbal/spicy flavour in beer. An intense grape fruit flavour was detected in beer brewed with extensively aged Cascade and Hallertauer hops. OES

Malt

1603 Delcour (JA), Van der Beken (R), Moerman (E), Vancraenenbroeck (R) and De Bock (A). Production of malt from proanthocyanidin-free barley Galant. **Technical Quarterly, Master Brewers Association of America** 23(3); 1986; 94-96

Influence of several malting parameters on the quality of malt produced in semi-industrial and industrial quality is discussed. The influences of parameters life germination temp., steeping degree, total time and gibberllic acid were comparable to those of normal barley. Other malt characteristics, the extract difference, diastatic power, wort colour and apparent attention gave 81.1% acceptable extract yields on an industrial scale. MVG

Wines

1604 Schlemmer (U). Reduction of lead content and of other metals in wine by means of pectic acid. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 183(5); 1986; 339-343 (De).

A procedure for reducing the Pb content in wines containing high levels of Pb is described. The reduction of Pb by means of pectic acid (PA) depends on the quality grade of the wine. In ,,Auslese'' (wine A) 6250 mg PA/l diminished Pb content in 24 h from 0.88 mg/l to 0.28 mg/l; in ,,Spatlese'' (wine B) from 0.83 mg/l to 0.06 mg/l. Under the same conditions the content of Fe, Zn, Cu decreased in wine A from 8.85 mg/l to 7.05 mg/l, from 4.75 mg/l to 1.25 mg/l, from 0.67 mg/l to 0.57 mg/l and in wine B from 6.70 mg/l to 5.41 mg/l, from 1.17 mg/l to 0.28 mg, 0.46 mg/l to 0.28 mg/l, respectively. PA is removed almost quantitatively by filtration. Sensory properties of treated wines were unchanged with concn. of PA of 750 mg and 1500 mg/l. A slight effect on taste at 6250 mg PA/l wine cannot be excluded. On account of its high affinity to Pb, PA will probably remove Pb from other liquid foods as well. AS

1605 Sponholz (W-R) and Dittrich (HH). Volatile fatty acids in wines of differing qualities. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 183(5); 1986; 344-347 (De).

The occurrence of volatile fatty acids (from C_1 to C_{10}) was determined quantitatively in German white wines of all qualities and in German and foreign red wines. For higher accuracy, especially for formic and acetic acid detn. a new method was developed. The acids where separated gas chromatographically as their butan-2-ol esters. In all wines examined acetic acid as aspected was the main acid. Formic acid was found in much lower quantities. Both acids increase with increasing wine quality. All the other fatty acids occur in decreasing amounts with increasing wine quality. This is seen very clearly in the Auslese"-wine group. In contrast to the corresponding higher alcohols 2-and 3-methylbutyric acid show always a 1:1 relationship. Quantitatively compared with acetic acid the higher fatty acids - especially in the group of "Auslese" wines-are only of minor importance. AS

Non-alcoholic beverages

1606 Peck (J). Condensation - disturbing factor in transport methods. **Tea and Coffee Trade Journal** 159(1); 1987; 86-90

1607 Taha (FS), Mohamed (SS) and El-Nockrashy (AS). The use of soybean, sunflower and lupin seeds in the preparation of protein bases for nutritious beverages. **Journal of the Science of Food and Agriculture** 37(12); 1986; 1209-1216

Seed meal of soybean, sunflower and lupin, and mixtures were examined for the preparation of protein bases suitable for nutritious beverages. Single step and successive extractions with aqueous calcium hydroxide solutions and water effect complete extraction of meal nitrogen. The calcium hydroxide extracted proteins of meal samples had an isoelectric pH of 5.0 at which 63-81% of the soluble protein was precipitated. Two successive extractions with calcium hydroxide and water had an isoelectric pH range of 4.4-4.6 and give max. precipitation of 67% of the extracted protein. A detailed procedure is given for the preparation of creamy or light greyish coloured protein, readily soluble in water, with improved amino acid pattern. AS

Coffee

1608 Clifford (MN), Shutler (S), Thomas (GA) and Ohiokpehai (O). The chlorogenic acids content of coffee substitutes. **Food Chemistry** 24(2); 1987; 99-107

This paper reports the chlorogenic acids content of unroasted chicory root and eleven coffee substitutes which contain either chicory or dandelion. Unroasted chicory root contained CQA and diCQA but at a much lower level than green coffee beans. In the roasted products only 5-CQA was found consistently and 4-CQA occasionally at levels approximately two orders of magnitude lower than in the corresponding roasted coffee products. The roasted substitutes were characterised chromatographically by very large amounts (some 80 to 95% of total chromatogram area) of rapidly eluting material. The chromatograms of most substitutes were characterised by a peak provisionally identified as 5-hydroxymethyl furfural. AS

1609 Terada (H), Tsubouchi (H), Yamamoto (K), Hisada (K) and Sakabe (Y). Liquid chromatographic determination of ochratoxin A in coffee beans and coffee products. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 960-964

A liquid chomatographic method for the detn. of ochratoxin A in coffee beans (green and roast), instant coffee, and coffee drink is described. The sample is subjected to extraction with methanol-1% aqueous sodium bicarbonate (1 + 1) and C18 cartridge cleanup. The extract is chromatographed on a Nucleosil 5C18 column with a mobile solvent of acetonitrile-water-0.2M phosphate buffer pH 7.5 (50 + 47 + 3) containing 3mM cetyltrimethylammonium bromide as an ion-pair reagent. Ochratoxin A is detected with a fluorometer (excitation 365 nm, emission 450 nm). The sensitivity was increased 20-fold by using ion-pair resolution. The detection limits corresponded to 2 μg/kg for coffee beans, 5 μg/kg for instant coffee, and 0.2 μg/kg for coffee drink. The recoveries from coffee products were generally better than 80.7% and the relative standard deviations were 3.43-5.93%. The peak coinciding with ochratoxin A can be confirmed by treatment using alcohol (methanol, ethanol, or N-propanol) and sulphuric acid. AS

Fruit juices

1610 Chaytor (JP). The analysis of amino acids in fruit juices by high-performance liquid chromatography. **Journal of the Science of Food and Agriculture** 37(10); 1986; 1019-1026

A method is described for the rapid detn. of amino acids in liquid foods by high-performance liquid chromatography (HPLC). The method has proved itself simple and reliable in use and is intended to provide amino acid profiles within 30-40 min of receipt of sample. Method assessment is discussed and the results obtained on typical processed foods are presented. AS

Softdrinks

1611 Marovatsanga (L) and Macrae (R). The determination of added azo dye in soft drinks via its reduction products. **Food Chemistry** 24(2); 1987; 83-98

The stability of amaranth (E123), an azo dye widely used in foods, was investigated in soft drinks. The rate of degradation of dye was monitored by spectrophotometry, and degradation products were separated and identified by HPLC. The formation of specific amines was clearly demonstrated and the levels of those amines produced in model systems and soft drinks were determined. These values were used to estimate the amounts of dye from which the amines had been derived. The method was applied to commercial soft drinks to estimate levels of amaranth initially added. AS

Tea

1612 Okada (S), Daengsubha (W), Uchimura (T), Ohara (N) and Kozaki (M). Flora of lactic acid bacteria in Miang produced in Northern Thailand. **Journal of General and Applied Microbiology** 32(1); 1986; 57-65

Flora of lactic acid bacteria in five **Miang** samples fermented tea leaves of Northern Thailand, was studied quantitatively and qualitatively. Lactic acid bacteria (10^3 to 10^5 g) were found in four samples, and none in one sample. The latter sample may have been greatly affected by the production of acid during the long fermentation. The ten representative isolates were characterized by their morphological, physiological, and chemical properties. All of these isolates were identified as **Lactobacillus plantarum** (Olra-Jensen) Bergey et al., with diaminopimelic acid (A_2 pm) peptidoglycan in the cell wall. Apparently the tea tannic acid in the **Miang** selected only the L. plantarum with A_2 pm peptidoglycan in the cell wall. This is interesting in view of the bacterial flora formation involved in **Miang** fermentation. AS

1613 Ullah (MR), Bordoloi (AK) and Gogoi (N). Hastening of leaf senescence in the processing of green tea leaf to black tea. **Journal of the Science of Food and Agriculture** 37(10); 1986; 1042-1044

The current system of processing green tea leaf (**Camellia sinensis**) to produce black tea involves a long period, especially because of the withering process practised in acquiring leaf senescence which is essential to impart fullness to the resulting tea liquors. Hastening leaf senescence by artificial withering at temp. favourable to enzymic transformations accelerated the process and considerably shortened the manufacture of black teas. AS

1614 Van Lelyveld (LJ) and De Rooster (K). Effect of field practice and factory processes on black tea quality. **Journal of Horticultural Science** 61(4); 1986; 549-553

Hand picking (of tea clone MT 12) bud plus one, or bud plus two gave better TF (theaflavin) values than coarser picking, particularly machine harvesting. The highest TF value for MT 12 and the seedling was either four CTC (cutting, tearing, curling) treatments or a combination of two rotorvane treatments plus two CTC. These two treatments gave a thorough maceration, allowing all sap to mix with the substrates during fermentation. Both MT 12 and the seedling gave good results with a fermentation time of from 30 to 180 min. A firing time of 20 to 30 min with an initial temp. of 96 C to a final temp. of 65 C gave the best results. KAR

FATS AND OILS

Fats

1615 Mancini-Filho (J), Smith (LM), Creveling (RK) and Al-shaikh (HF). Effects of selected chemical treatments on quality of fats used for deep frying. **Journal of the American Oil Chemists" Society** 63(11); 1986; 1452-1456

Commercially used shortenings were treated with various adsorbents and additives in order to improve their quality and stability. The parameters studied were improvement in dielectric constant, free fatty acids, colour (absorbance at 420 nm) and total polar materials. Bleaching clay, charcoal, magnesium oxide and celite and their mixtures effectively reduced one or more parameters in used vegetable are annual-vegetable shortenings. However, when the treated fats were used in the laboratory to fry more french fried potatoes they often deteriorated more rapidly than the untreated control fats. The various treatments employed, improved the quality parameters, but continued frying after treatment led to greater deterioration than occurred in the untreated control fats. OES

Lipids

1616 Seymour (MP), Jefferies (TM) and Notarianni (LJ). Large-scale separation of lipids from organochlorine pesticides and polychlorinated biphenyls using a polymeric high-performance liquid chromatographic column. **Analyst** 111(10); 1986; 1203-1205

The separation of organochlorine pesticides and polychlorinated biphenyls from a high concn. of lipid has been achieved using a polymeric column designed for high-performance liquid chromatography. The method, which can be used as a clean-up step in residue analysis procedures, has a high lipid capacity but low solvent consumption. Recoveries of both lipid and selected organochlorine compounds were routinely over 90% at p.p.m. levels. AS

Oils

Amaranth seed oils

1617 Lyon (CK) and Becker (R). Extraction and refining of oil from amaranth seed. **Journal of the American Oil Chemists" Society** 64(2); 1987; 233-236

Oil was extracted with hexane on a pilot plant scale from seeds of **Amaranthus cruentus** after the seeds were subjected to an efficient abrasive milling. Optimum conditions were then determined for refining and bleaching this oil. The yellow oil obtained is similar in appearance and composition to corn oil, but comparison with previously published analyses reveals a considerable variation in the content of the principal fatty acids, palmitic, oleic and linoleic, although the squalene content (5-8%) was in the expected range. AS

Avocado oil

1618 Werman (MJ) and Neeman (I). Avocado oil production and chemical characteristics. **Journal of the American Oil Chemists" Society** 64(2); 1987; 229-232

This study examined the influences of temp. pH and NaCl concn. on oil production efficiency by the centrifugal process and also differences in the chem. characteristics between avacado oils produced industrially and in the laboratory. BV

Essential Oils

1619 Lawrence (BM). Progress in essential oils. **Perfumer & Flavorist** 11(5); 1986; 111-112, 113, 114, 1

Covers clary say oil; Ylang oil. BV

Olive oils

1620 Han (D) and Rhee (JS). Characteristics of lipase-catalyzed hydrolysis of olive oil in AOT-isooctane reversed micelles. **Biotechnology and Bioengineering** 28(8); 1986; 1250-1255

Candida rugosa lipase solubilized in organic solvents in the presence of both surfactant and water could catalyze the hydrolysis of triglycerides, and kinetic analysis of the lipase-catalyzed reaction was found to be possible in this system. Among eight organic solvents tested, isooctane was most effective for the hydrolysis of olive oil in reversed micelles. Temp. effect, pH profile, K_m, App and k_m, App were determined. Among various chemical compounds, Cu^{2+}, Hg^{2+}, and Fe^{2+} inhibited lipase severely. But the enzyme activity was restorable partially by adding histidine or glycine to the system containing these metal ions. The enzyme activity was dependent on R (molar ratio of water to surfactant) and max. activity was obtained at R = 10.5. Upon addition of glycerol to the reversed micelles, lipase activity was affected in a different fashion depending on the R values. Stability of the lipase in reversed micelles was also dependent on R, and it was most stable at R = 5.5. AS

Soybean oils

1621 Warner (K) and Frankel (EN). Effects of Beta-carotene on light stability of soybean oil. **Journal of the American Oil Chemists" Society** 64(2); 1987; 213-218

Beta-Carotene was added to soybean salad oils to study its effect in inhibiting flavour deterioration due to light exposure. Flavour evaluations indicated that (a) when oils treated with citric acid were exposed to light (7535 lux) for 8 to 16 h, oils containing 5 to 10 ppm Beta-carotene showed improved flavour stability compared to oils containing 0 to 1 ppm Beta-carotene; and (b) when oils were not treated with citric acid, only oils containing 20 ppm Beta-carotene were more stable to light. Capillary gas chromatographic analysis showed that the addition of 1 to 20 ppm of Beta-carotene significantly decreased formation of 2-heptenal and 2, 4-decadienal in the absence or presence of citric acid. Detn. of peroxide values showed the same trends as gas chromatographic analyses of volatiles. In the presence of 15 and 20 ppm Beta-carotene, some off-flavours, as well as poor ratings for colour quality, were reported by panelists. Therefore, flavour deterioration initiated by light can be inhibited effectively in soybean oil, without affecting colour quality, by addition of Beta-carotene at concn. from 5 to 10 ppm to oils treated with citric acid. AS

SPICES AND CONDIMENTS

Spices

Capsicum

1622 Govindarajan (VS). Capsicum - production, technology, chemistry, and quality. Part III. Chemistry of the colour, aroma, and pungency stimuli. **CRC Critical Reviews in Food Science and Nutrition** 24(3); 1986; 245-355

Aspects reviewed in this part include: chemistry of colour stimuli in capsicum fruits; biochemistry of capsicum carotenoids; chemistry of aroma stimuli in capsicum fruits; chemistry of the pungency stimuli in capsicum; and synthetic and biosynthetic aspects of capsaicinoids. BV

SENSORY EVALUATION

Nil

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Infestation control

1623 Conway (JA). Insects and other arthropods recorded on stored food commodities in Nepal and Bhutan. **Tropical Science** 26(3); 1986; 145-162

Grain storage systems at farm and commercial level are described for Nepal and Bhutan and the significance of entomological records is also discussed. BV

Pesticides

BHC

1624 Grorud (RB). Gas chromatographic determination of lindane (Gamma isomer of BHC) in maneb-lindane liquid pesticide formulations. **Journal of the Association of Official Analytical Chemists** 69(6); 1986; 929-930

BIOCHEMISTRY AND NUTRITION

Nutrition

1625 Kalpana (A), Poovamma (K) and Saraswathi (G). Bioavailability of dietary iron - A review. **Arogya** 13(1); 1987; 1-16

Briefly reviews the dietary iron content and its bioavailability. Aspects covered include physiology of iron absorption, techniques to study bioavailability of iron, dietary factors influencing iron absorption, effect of household processing on the bioavailability of iron, iron bioavailability from different foods, bioavailability of iron from meals; and poor iron bioavailability in habitual Indian diets and its improvement. BV

TOXICOLOGY

Fusarium

1626 Paster (N), Barkai-Golan (R) and Calderon (M). Control of T-2 toxin production using atmospheric gases. **Journal of Food Protection** 49(8); 1986; 615-617

When the fungus **Fusarium tricinctum** NRRL 3299 was grown under atm. enriched with 50% carbon dioxide and above (given incombination with 20% oxygen), T-2 production was reduced to 4.0 µg/45 ml of medium, as compared with 21.2 µg/45 ml of medium produced in an atm. of air. At 60% carbon dioxide/20% oxygen, and 80% carbon dioxide/20% oxygen, a significant reduction in fungal growth was also observed. The possibility of using controlled atm. as a means for mycotoxin control is discussed. AS

Mycotoxins

Aflatoxins

1627 Buchanan (RL), Stahl (HG), Ocker (LA), Kunsch (CA) and Purcell (CJJr). Thioglycerol inhibition of growth and aflatoxin production in **Aspergillus parasiticus. Journal of General Microibology** 132(10); 1986; 2767-2773

The effects of thioglycerol on growth and aflatoxin production by **Aspergillus Parasiticus** were studied using conidia-initiated cultures and pregrown mycelia. Thioglycerol inhibited both growth and aflatoxin synthesis, with toxin formation being affected to a greater extent. This inhibitory activity could not be overcome by addition of methionine or zinc sulphate. Accompanying respirometric studies suggested that the primary mode of action of thioglycerol involves an inhibition of oxygen utilization. AS

Aflatoxins

1628 Rusul (G), El-Gazzar (FE) and Marth (EH). Growth of and aflatoxin production by **Aspergillus parasiticus** in a medium containing potassium chloride or a mixture of potassium chloride and sodium chloride. **Journal of Food Protection** 49(11); 1986; 880-885

FOOD LAWS AND REGULATIONS

1629 Coles (L). Food irradiation - labelling and enforcement aspects. **IFST Proceedings** 19(4); 1986; 185-187

1630 Lecos (CW). The growing use of irradiation to preserve food. **Dairy and Food Sanitation** 6(11); 1986; 488-490

Discusses the FDA regulations on the expanded use of irradiation to preserve food (dried herbs, spices, vegetable seasonings, fruits and vegetables). BV

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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm, cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal,kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg,ml,mm)
m-equiv	milli-equivalent
$\mathcal{M}$	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano- (10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-(as in µg, µm)
%	per centum
>	greater than
⩾	greater than or equal to; not less than
<	less than
⩽	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

GENERAL

1631 Boswell (J) and McGuiness (P). And what of the consumer? **Food** 8(12); 1986; 42-43

A survey report on the acceptance of irradiated foods by consumers.·BV

1632 Bourland (CT). Space station food system requirements. **Activities Report** 38(2); 1986; 12-15

1633 Reed (DE). Pioneers in space feeding: An historical outline. **Activities Report** 38(2); 1986; 1-4

1634 Thurmond (BA). Space station food system development. **Activities Report** 38(2); 1986; 10-11

FOOD PROCESSING

1635 Banks (TG). The perfect combination. **Food** 9(1); 1987; 36-37, 39

Reviews the use of combination techniques (chemical, physical and biological agents) for food preservation. BV

1636 Richardson (PS). Review: Flame sterilization. **International Journal of Food Science and Technology** 22(1); 1987; 3-14

The details of the commercial developments of the two commercial processes which have been patented using the technique of flame sterilization and its prospects have been discussed. The high temp. driving force achieved in the order of 1700 C between the flame and the can together with efficient mixing of the product are responsible for the rapid heat transfer. Though the processing is achieved at atm. pressure but are to the internal pressures developed upto 275 PA it is primarily used for cans less than 90 mm dr. This tchhnique is applicable to the processing of both high and low acid products and may be used to exhaust packs to produce a high vacuum when cooled later. Many factors like initial microbial load, temp. and processing conditions, particle size, headspace, thermal properties of the pack etc. affect the degree of sterilising of the processed products. The quality of the finished products depends on the quality of the raw materials, processing conditions and the vacuum achieved in the cans. NGKR

Extrusion

1637 Fell (J). Extrusion. A revolution in food manufacture. **Food Manufacture** 62(1); 1987; 27, 29

FOOD PACKAGING

1638 Hudson (SB). Computer solutions for retort processing problems. **Activities Report** 38(2); 1986; 40-43

Packaging materials

Tinplate

1639 Montanari (A). Use of impedance measurements in the study of lacquered tinplates. **Industria Conserve** 61(2); 1986; 129-137 (It).

The possibility was examined of using an AC electrochemical technique (impedance measurements) to evaluate the protective characteristics of lacquer films on tinplate. To this purpose, different kinds of organic coatings (epoxyphenolic, acrylic, organosols, powders) were compared in the presence of aggressive beverages (coke, "gassosa", wine). The technique tested gave results in good agreement with packing tests, but in decidedly shorter times. It also allowed organic films with different protective power to be discriminated by following the course of the corrosion process with regard to porosity and adherence of the lacquers. AS

FOOD ENGINEERING AND EQUIPMENT

1640 Pham (QT). Moisture transfer due to temperature changes or fluctuations. **Journal of Food Engineering** 6(1); 1987; 33-49

During processes involving temp. and humidity changes or fluctuations, products tend to gain or lose moisture. Elementary psychrometry enables the direction and maximal possible moisture change (in terms of percentage wt. change) to be calculated from a min. of data. Equations and graphical methods are presented and illustrated with examples: cooling and freezing of meat, product temp. fluctuations due to air infiltration or heat conduction during storage, transport by unrefrigerated containers. AS

1641 Schubert (H). Food particle technology. Part I. Properties of particles and particulate food systems. **Journal of Food Engineering** 6(1); 1987; 1-32

In this article the properties and the characterization of individual particulate systems are reviewed, special emphasis being given to particle size and shape, particle size distribution, interparticle adhesion, porosity, capillary action in porous media, 'instant' and flow properties of powders. KAR

Equipment

Freezer

1642 Visser (K). Automatic plate freezer development. **International Journal of Refrigeration** 9(6); 1986; 367

The advantages of the plate freezing method of meat processing are discussed. The process incorporates the techniques of electrical stimulation, hot boning and alternative packaging. AS

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

1643 Ola Lawal (R). Effect of roasting on the chemical composition of the seeds of **Treculia africana**. **Food Chemistry** 22(4); 1986; 305-314

Roasting did not affect significantly the proximate composition of the raw seeds of **Treculia africana**. Only moisture content showed a significant decrease (16.1%). The levels of potassium and calcium increased significantly (39.2% and 28.2% respectively) on roasting. Significant reductions in the levels of thiamin (30.6%), riboflavin (25.6%), ascorbic acid (40.0%) and Beta-carotene (24.5%) were also observed. Amino acid analysis showed losses for lysine (12.1%), isoleucine (13.0%) and leucine (12.7%). OES

Chemistry (Analytical)

1644 Kim (H-J), Park (GY) and Kim (Y-K). Analysis of sulphites in foods by ion exclusion chromatography with electrochemical detection. **Food Technology** 41(1); 1987; 85-91

1645 Siemer (DD). Use of solid boric acid as an ammonia absorbent in the determination of nitrogen. **Analyst** 111(9); 1986; 1013-1015

An inexpensive trap-de-mister assembly utilising solid crystalline boric acid as an ammonia absorbent was developed to replace the specialised trap-condenser-impinger apparatus normally used in Kjeldahl-type distillations. The boric acid is subsequently dissolved in water and a final detn. of the ammonium ion is made either by acidimetric titration, a conductance measurement or spectrophotometric measurement after the addition of Nessler's reagent. The apparatus fits into the neck of a calibrated flask during the distillation and is itself constructed from disposable plastic pipette tips, glass-wool and rubber tubing. Both the high surface area and the tortuosity of the paths through the randomly packed bed of crystals makes solid boric acid an efficient ammonia absorbent. The system is useful for small-scale separations only because, when the volume of solution from which the ammonia is distilled exceeds 25 ml, the acid crystals become saturated with water and begin to dissolve before all of the ammonia is trapped. AS

1646 Therion (JJ), Human (HGC), Claase (C), Mackie (RI) and Kistner (A). Automatic nitrogen-15 analyser for use in biological research. **Analyst** 111(9); 1986; 1017-1021

An automatic nitrogen-15 analyser capable of analysing 12-20 samples per h. has been developed. The generation of pure nitrogen gas from the sample is carried out automatically, the nitrogen isotope ratio is determined by emission spectrometry and the results are calculated as atom% nitrogen-15. The total nitrogen content of the sample is also determined. Sample masses can vary between 0.5 and 100 mg and only 2-10 μg amounts of N are necessary for accurate detn. AS

FOOD MICROBIOLOGY AND HYGIENE

1647 Dempster (JF) and Halls (NA). Responses to gamma radiation of selected microorganisms in sterile water and bovine muscle. **Irish Journal of Food Science and Technology** 10(1); 1986; 57-60

The responses to Gamma-irradiation of a number of food associated microorganisms (**Staphylococcus aureus, Yersinia enterococolitica, Pseudomonas putrefaciens**) were studied in sterile distilled water and sterile bovine muscle slurry. Surviving cells were grown aerobically at room temp. on yeast extract dextrose tryptone agar (PCA, Oxoid). The D_{10} of the **Pseudomonas** sp. was 27 Gy in water and the D_{10} of the **Yersinia** sp. in water was 32 Gy. In the slurry resistance increased markedly; the **Pseudomonas** sp. was ten times more resistant (D_{10} 260 Gy) and the **Yersinia** sp. was seven times more resistant (D_{10} 226 Gy). The **Staph. aureus** was about equally sensitive in both systems. AS

1648 Hesseltine (CW) and Koritala (S). Screening of industrial microorganisms for growth on soybean soapstock. **Process Biochemistry** 22(1); 1987; 9-12

Soybean soapstock, a by-product of soybean oil refining is widely used substrate in fermentation industry. Soybean soapstock as a fermentation substrate, both with and without pH adjustment (pH 8 to 11.5) for a number of representative microorganisms is evaluated. Of the microorganisms screened (yeasts, fungi, bacteria, actinomycetes), 26 strains grew with the pH unadjusted, 72 grew at pH 8, and 58 strains failed to grow under either condition. Of 12 strains, one grew at pH 10, and 9 grew at above pH 11. The composition of soybean soapstock were adequate for microbial growth. BV

1649 Rao (MA) and Lund (DB). Kinetics of thermal softening of foods. A review. **Journal of Food Processing and Preservation** 10(4); 1986; 311-329

Aspects covered in the review include kinetic models, experimental methods for studying softening; effect of chemical and physical changes on texture of foods; and data on thermal softening of foods. KAR

1650 Sadeghi (F), Hamid-Samimi (MH) and Swartzel (KR). Micro-computer program for determining the unique time-temperature associated with the equivalent point method of thermal evaluation. **Journal of Food Processing and Preservation** 10(4); 1986; 331-335

Enzymes

1651 Antrim (RL) and Auterinen (AL). A new regenerable immobilized glucose isomerase. **Starch/Starke** 38(4); 1986; 132-137

1652 Dubey (AK), Mukhopadhyay (SN), Bisaria (VS) and Ghose (TK). Sources, production and purification of restriction enzymes. **Process Biochemistry** 22(1); 1987; 25-34

This review deals with restriction enzymes. Aspects covered include sources; production of restriction enzymes, upstream processing for production, downstream processing for isolation; definition of activity; physico-chemical properties of restriction enzymes; storage; general restriction conditions; binding sites; and future scope. BV

Amylases

1653 Srivastava (RAK) and Baruah (JN). Culture conditions for production of thermostable amylase by **Bacillus stearothermophilus. Applied and Environmental Microbiology** 52(1); 1986; 179-184

Fermentation

1654 Sandine (WE). Genetic manipulation to improve food fermentation. **Dairy and Food Sanitation** 6(12); 1986; 548-550

Microorganisms

1655 Jarvis (GA) and Malcolm (SA). Comparison of three-class attributes sampling plans and variables sampling plans for lot acceptance sampling in food microbiology. **Journal of Food Protection** 49(9); 1986; 724-728

Bacteria

Bacillus

1656 Quaranta (HO), Piccini (JL) and Eterovic (JE). Identification of **Bacillus** species in foods: BIP 84 - a computer program for an artificial key. **Indian Journal of Microbiology** 26(3/4); 1986; 208-209

A computer program written in BASIC was designed to use an artificial key for identification of **Bacillus** sp. commonly encountered in foods. This key is based on biochemical tests and was specially designed for rapid confirmation of **Bacillus cereus**. KAR

Streptococcus cremoris

1657 Steenson (LR) and Klaenhammer (TR). Plasmid heterogeneity in **Streptococcus cremoris** M12R: Effects on proteolytic activity and host-dependent phage replication. **Journal of Dairy Science** 69(9); 1986; 2227-2236

Fungi

Mushrooms

1658 Rajarathnam (S), Wankhede (DB) and Zakia Bano. Degradation of rice straw by **Pleurotus flabellatus. Journal of Chemical Technology and Biotechnology** 37(3); 1987; 203-214

The potential applications of the rice straw substrate as an upgraded form of rumen feed and for the production of single cell protein are discussed in this paper. In this connection the degradative changes in the constituents of rice straw substrate during the growth and commercial production of fruit bodies by **Pleurotus flabellatus** were investigated. It was found that there was a continuous increase in the free sugars from the time of inoculation whereas the free amino acids reached a max. at the end of mycelial growth and later showed a little decrease after fructification. Degradation of the straw substrate by the fungus reached a max. at the end of harvest of the fruit bodies. The spent straw substrate contained free sugars and amino acids respectively 5 and 2 times the concn. of those in the undegraded straw substrate and lignin decreased to about 25% of the level in the straw before fermentation. The fungus under study has been investigated by colour reactions demonstration of the enzymes, degradation of lignin and proved to be white rot fungus. NGKR

Yeasts

1659 Shay (LK) and Wegner (GH). Improved fermentation process for producing torula yeast. **Food Technology** 39(10); 1985; 61-66

Aspects covered in this review include development of advanced process; growth of yeast on ethanol; production of food yeast from carbohydrates; and the advantages of fermentation processes. KAR

Hygiene

1660 Cerqueira-campos (M-L), Peterkin (PI) and Sharpe (AN). Improved immunological membrane filter method for detection of food-borne **Salmonella** strains. **Applied and Environmental Microbiology** 52(1); 1986; 124-127

An improved membrane filter method that involves the use of an enzyme-labelled antibody stain has been developed for the rapid detection of **Salmonella** species in foods. The procedure is carried out directly on a hydrophobic grid-membrane filter without requiring transfer by blotting to nitrocellulose. Pure cultures of 54 **Salmonella** species and 10 foods artificially contaminated with **Salmonella colindale** gave a positive reaction in which **Salmonella** colonies were visible as purple dots. Of 11 non-salmonella organisms, only **Citrobacter freundii** reacted with Spicer-Edwards antiserum. Of 22 naturally contaminated food samples, 10 were positive for both the hydrophobic grid-membrane filter procedure of the Association of Official Analytical Chemists and the improved enzyme-labeled antibody stain method, and there was perfect agreement between the methods. Of these 10 positive samples, one was negative by the Health Protection Branch method; of the negative samples, two were positive by this latter method. The improved enzyme-labeled antibody stain method allows detection of **Salmonella** spp. in foods within 48 h, requires little equipment, and is inexpensive, easy to perform, and suitable for automated detection. AS

1661 Rhodehamel (EJ), Reddy (NR) and Pierson (MD). Growth of **Staphylococcus aureus** S-6 and **Yersinia enterococolitica** CDC A2635 in cow, soy and winged bean milks. **Journal of Food Quality** 9(6); 1987; 387-398

The two common foodborne pathogens, **Staphylococcus aureus** S-6 and **Yersinia enterococolitica** CDC A2635 were inoculated into whole cow, soy and winged bean milks and incubated at three different temp. (10, 25, 37 C) to evaluate the potential for their growth. The legume milks were prepared by a hot grind method from either whole soybeans (Essex var.) or whole winged beans (Chimbu var.). In general, both foodborne pathogens grew well in all test media. However, **Staph. aureus** incubated at 10 C for 120 h, and **Y. enterococolitica** incubated at 37 C for 48 h were the only two conditions in which less than 10^8 cells/mL were obtained. AS

Pseudomonas

1662 Al-Shibib (AS) and Al-Musleh (R). Characterisation of **Pseudomonas aeruginosa** strains isolated from Iraqi foods. **Indian Journal of Microbiology** 25(3/4); 1985; 223-225

Sixty food samples comprising of cheese, fresh meat, fresh chicken, fresh fish and eggs of Iraq were examined for the presence of **Ps. aeruginosa**; 15 strains were isolated. Using slide method 100% of the isolates could be serotyped and about 50% by aeruginocin method, 80% of the strains were represented by serotype 0:11. The use of two additional indicators (AIIMS 785/76 and AIIMS 790/76) improved the typability to 80%. KAR

BIOTECHNOLOGY

1663 Lal (R), Lal (S) and Shivaji (S). Use of microbes for detoxification of pesticides. **CRC Critical Reviews in Biotechnology** 3(1); 1986; 1-16

This review covers microbial methods for detoxification and disposal of pesticides; and genetic engineering and detoxification of pesticides. BV

1664 Murthy (VVPS), Ramachandran (KB) and Ghose (TK). Gas hold-up and power consumption in an air-pulsed column bioreactor. **Process Biochemistry** 22(1); 1987; 3-8

Describes the air-pulsed column bioreactor and presents the gas hold-up, and power consumption data obtained by experiments under various operating conditions of Newtonian and non-Newtonian fluids. The results indicate that air-pulsed columns have moderate power requirement and higher gas hold-up than many other bioreactors. Air-pulsed perforated plate column has good potential for its application to aerobic bioconversions. BV

1665 Workman (WE), McLinden (JH) and Dean (DH). Genetic engineering applications to biotechnology in the genus **Bacillus**. **CRC Critical Reviews in Biotechnology** 3(3); 1986; 199-234

Covers genetic engineering capabilities in the genus **Bacillus** and application of genetic engineering to biotechnology in the genus **Bacillus** (microbial pesticides). BV

TISSUE CULTURE

Nil

FOOD ADDITIVES

1666 Seal (R). Facing up to the 'additives' challenge. **Food Manufacture** 61(12); 1986; 40-41

Briefly discusses antioxidants; preservatives and emulsifiers. BV

Antioxidants

Butylated hydroxyanisole

1667 Post (LS) and Davidson (PM). Lethal effect of butylated hydroxyanisole as related to bacterial fatty acid composition. **Applied and Environmental Microbiology** 52(1); 1986; 214-216

Bacillus cereus, **Clostridium perfringens**, **Staphylococcus aureus**, **Pseudomonas fluorescens**, **Pseudomonas fragi**, **Escherichia coli**, and **Salmonella "natum"** were challenged with butylated hydroxyanisole (BHA). Susceptibility was measured as the concn. of BHA required to cause a 90% reduction in bacterial survivors., **Staph. aureus** LP and **Ps. fragi**

were two of the most resistant species examined; **Cl. perfringens** and **Ps. fluorescens** were the most susceptible. Gram stain reaction was found not to be a strict indicator of bacterial susceptibility to BHA. There was no obvious relationship between individual fatty acids and susceptibility. The ratio of saturated to unsaturated fatty acids in the total lipid fraction of only the gram-positive species was related to susceptibility. The ratios of saturated to unsaturated fatty acids of other fractions were not related to susceptibility. AS

Emulsifiers

1668 Lahtinen (S). Masking of the bitter taste of salt substitutes with lactose in food emulsions. **Journal of Food Quality** 9(4); 1986; 199-204

Flavourings

1669 DeSimone (RS) and Byrne (B). Aldehyde generators for flavours. **Perfumer & Flavorist** 11(6); 1987; 15-26

Aspects covered includes: difficulties in use; stabilization approaches; generators, synthetic vs. natural; review of patented systems; commercial systems; GRAS acetates; designer generators and precautions for use. BV

Preservatives

Nitrites

1670 Wood (DS), Collins-Thompson (DL), Usborne (WR) and Picard (B). An evaluation of antibotulinal activity in nitrite-free curing systems containing dinitrosyl ferrohemochrome. **Journal of Food Protection** 49(9); 1986; 691-695

Stabilizers

Gums

1671 Ink (SL) and Hurt (HD). Nutritional implications of gums. **Food Technology** 41(1); 1987; 77-82

1672 Kaletunc-Gencer (G) and Peleg (M). Rheological characteristics of selected food gum mixtures in solution. **Journal of Texture Studies** 17(1); 1986; 61-70

The viscosity of pure and mixed dilute solutions of commercial alginate, carrageenan, guar gum, CMC and gelatin solutions at different mixing ratios were measured by a coaxial viscosimeter at different shear rates. The results are presented in the form of measured viscosity divided by the expected viscosity, if no interaction between the gums existed. This technique provides a clear demonstration of the existence of synergism or antagonism between the gums and helps in quantitatively assessing their extent. AS

Sweeteners

1673 Gelardi (RC). The multiple sweetener approach and new sweeteners on the horizon. **Food Technology** 41(1); 1987; 123-124

After discussing the multiple sweetener approach and taste functionality, the author has listed the new sweeteners which include acesulfame K, alitame, thaumatin, stevioside, trichlorogalactosucrose, gemsweet and others. KAR

1674 Wagner (BM). New concepts in sweetener development-safety assessment revisited. **Food Technology** 41(1); 1987; 122, 124

Aspartame

1675 Stegink (LD). Aspartame: Review of the safety issues. **Food Technology** 41(1); 1987; 119-121

Saccharin

1676 Bakal (AI). Saccharin functionality and safety. **Food Technology** 41(1); 1987; 117-118

CEREALS

1677 Bartnik (M) and Szafranska (I). Changes in phytate content and phytase activity during the germination of some cereals. **Journal of Cereal Science** 5(1); 1987; 23-28

Changes in phytase activity and phytate content in the cereals, wheat, rye, barley and oat were determined during germination. The contents of phytate phosphorus in wheat, rye, barley and oat were 2.84-3.45 mg, 2.47-2.65 mg, 2.78 mg and 3.14 mg/g respectively. There were also marked differences in phytase activity in these grains, the highest activity occurring in rye and the lowest in oat. Phytase activities increased during germination. After four days the activities in wheat, barley and oat increased about 4.5-, 6- and 9-fold respectively and in rye after three days of germination they increased about 2.5-fold. The phytate contents in wheat, rye, barley and oats decreased during the course of germination. Attempts to utilise highly sprouted rye grain as a potential source of phytase to increase hydrolysis of phytate in dough prepared from phytate-rich raw materials were ineffective. AS

1678 Fretzdorff (B) and Seiler (K). The effect of twin-screw extrusion cooking on cereal enzymes. **Journal of Cereal Science** 5(1); 1987; 73-82

The effects of extrusion cooking on the residual activities of six enzymes in wheat, rye and oats and several milling products were investigated. In general, enzyme inactivation increased as extrusion temp. increased. Alpha-Amylase activity in oats, however, was higher in some extrusion products than in the original grain. The thermostable enzymes (lipolytic acyl hydrolase, Alpha-amylase, and peroxidase) differed consistently from the thermolabile enzymes (Alpha-benzoyl-L-arginine-p-nitroanilide-hydrolase, catalase and lipoxygenase). Wheat bran, broken and unbroken oat kernels were extruded at two moisture levels (18 and 30%). Whereas lipolytic acyl hydrolase activity was lower in material extruded at 30% moisture, residual Alpha-amylase activities were higher at this moisture level. Peroxidase activity in oats, unlike that in wheat bran, was inactivated to a greater extent at the 30% than at the 18% moisture level. AS

1679 Hashimoto (S), Shogren (MD), Bolte (LC) and Pomeranz (Y). Cereal pentosans: Their estimation and significance. III. Pentosans in abraded grains and milling by-products. **Cereal Chemistry** 64(1); 1987; 39-41

The use of orcinol-HCl method for the estimation of pentosans in high-fiber, whole and abraded cereal grains is described. MVG

1680 Wood (PJ) and Weisz (J). Detection and assay of (1→4)-Beta-D-glucanase, (1→3)-Beta-D-glucanase, (1→3)(1→4)-Beta-D-glucanase, and xylanase based on complex formation of substrate with Congo red. **Cereal Chemistry** 64(1); 1987; 8-15

The dye binding of Congo red by cereal (1→3)(1→4)-Beta-D-glucans, substituted celluloses, O-(carboxymethyl)pachyman, and larchwood xylan may be used to detect and estimate (1→3)(1→4)-Beta-D-glucanase, (1→4)-Beta-D-glucanase, (1→3)-Beta-D-glucanase, and xylanase activities, respectively. Oligosaccharide reaction products, resulting from enzyme activity on these polysaccharides, do not bind Congo red. This can be monitored in solution and was exploited in a gel-diffusion assay system in which radial diffusion of enzyme into a substrate-bearing gel slab was detected by Congo red staining. The diameter of the reaction zone was proportional to the logarithm of the enzyme concn. Gel diffusion measurements of (1-3)-Beta-D-glucanase activity in germinating barley corresponded well to viscometrically determined values. The method was applied to survey commercial amylolytic enzymes for Beta-D-glucanase and xylanase contamination. AS

1681 Zabik (ME). Impact of ready-to-eat cereal consumption on nutrient intake. **Cereal Foods World** 32(3); 1987; 234, 236-239

Barley

1682 Bhatty (RS). Milling yield and flour quality of hulless barley. **Cereal Foods World** 32(3); 1987; 268, 270, 272

1683 Loi (L), Barton (PA) and Fincher (GB). Survival of barley (1→3, 1→4)-Beta-glucanase isoenzymes during kilning and mashing. **Journal of Cereal Science** 5(1); 1987; 45-50

Green malt and samples of kiln-dried malt collected from a commercial malt-house were monitored for (1→3, 1→4)-Beta-glucan endohydrolase activity. The finished malt, which was dried at temp. upto 80 C, retained 38% of the activity detected in green malt. Immunological assays revealed that the activity in kiln-dried malt was attributable entirely to (1→3, 1→4)-Beta-glucanase isoenzyme II and that isoenzyme I disappeared during initial drying at 60 to 65 C. When the kiln-dried malt was subjected to laboratory-scale mashing at 45 C, approx. 50% of the initial (1→3, 1→4)-Beta-glucanase activity remained stable for at least 30 min. Although activity was lost more rapidly as mashing temp. increased, significant (1→3, 1→4)-Beta-glucanase activity survived for up to 5 min at mashing temp. of 65 C. AS

1684 Singh (T) and Sosulski (FW). Amino acid composition of malts. Effect of germination and gibberellic acid on hulled and hulless barley and utility wheat. **Journal of Agricultural and Food Chemistry** 34(6); 1986; 1012-1016

The changes in the amino acids of the malts of hulled and hulless barley and utility wheat as influenced by germination and gibberellic acid treatment are studied. Changes in the proportion of total essential (E) to total amino acids (T) in protein (E/T %) and chemical score profile of essential amino acids are reported. OES

Breakfast cereals

1685 Fast (RB). Breakfast cereals. Processed grains for human consumption. **Cereal Foods World** 32(3); 1987; 241-242, 244

This article covers aspects like categories and manufacturing processes including flaked cereals, gun-puffed whole grain, extruded gun-puffed cereals, shredded whole grains, new puffed cereals, granolas and related products; shelf-life of baked products and uses and consumption pattern. KAR

Oats

1686 Doublier (JL), Paton (D) and Llamas (G). A rheological investigation of oat starch pastes. **Cereal Chemistry** 64(1); 1987; 21-26

Oat starch (var. Sentinel) was subjected to a controlled pasting procedure and subsequently examined for several physicochemical and rheological properties. Oat starch pastes displayed marked thixotropy in their shear stress/shear rate flow curve in contrast to wheat and corn starches pasted at the same concn. Higher swelling power and solubility values for oat starch gave rise to correspondingly higher values for the volume fraction of the disperse phase, O, and of the concn. of solubles in the continuous phase, C_s Amylose and amylopectin were unexpectedly co-leached from oat starch granules under some measure of influence of the internally bound starch lipids. The implications of these differences in physicochemical properties are discussed in relation to the observed rheological behaviour of oat starch pastes. These differences also serve as a possible explanation for oat pastes or gels being more translucent and less susceptible to retrogradation. AS

Rice

1687 Juliano (BO), Ibabao (MGB), Perez (CM), Clark (RB), Maranville (JW), Mamaril (CP), Choudhury (NH), Momuat (CJS) and Corpuz (IT). Effect of soil sulphur deficiency on sulphur amino acids and elements in brown rice. **Cereal Chemistry** 64(1); 1987; 27-30

The effect of soil sulphur deficiency and its amelioration on contents of sulphur amino acids and of other elements estimated by energy-dispersive X-ray fluorescence spectrometry was determined on brown rice produced in sulphur-deficient soils in Bangladesh, Indonesia, and the Philippines. Cysteine plus methionine levels in protein were normal for rice grown in control plots and comparable to those grown in treated plots in field experiments in Bangladesh and Indonesia. Low cysteine plus methionine levels in protein were observed only in pot experiments in brown rice with N:S ratios of 16 and 25. Amino acid sulphur accounted for a mean of 78% of total sulphur in the 32 brown rices investigated. Levels of elements in brown rice were not affected by sulphur treatment of the sulphur-deficient soils. AS

Rice bran

1688 Tashiro (M) and Maki (Z). Stability and specificity of rice bran trypsin inhibitor. **Journal of Nutritional Science and Vitaminology** 32(6); 1986; 591-599

The stability and inhibitory specificity of rice bran trypsin inhibitor (RBTI) was investigated in an attempt to understand its nutritional significance. RBTI retained about 100% of its original activity over a pH range from 4 to 10 during 24 h incubation at 37 C. In heat treatment, RBTI at acidic and neutral pH values still possessed about 50% of its initial activity after 30 min incubation at 100 C, although it was completely inactivated during 15 min. incubation at pH 10 and 100 C. The effects of metal ions and some reagents on RBTI were examined and it was found that Hg ion reduced RBTI's inhibitor activity: The inhibitor lost 30-100% of its original activity upon incubation with a reducing, an oxidizing or a thiol reagent. Digestion tests on RBTI indicated that -chymotrypsin did not affect the inhibitory activity and pepsin caused only a 30% loss of the initial inhibitory activity after 24 h digestion. To determine inhibitory specificity, bovine, hog, rat, and human trypsins were used as a target enzymes bound to an immobilized RBTI column. Titrations of the purified enzymes with RBTI showed that bovine, hog, and rat trypsins were powerfully inhibited by the inhibitor, while human trypsin was only weakly inhibited. AS

Rice starch

1689 Asaoka (M), Okuno (K), Sugimoto (Y), Yano (M), Omura (T) and Fuwa (H). Characterization of endosperm starch from high-amylose mutants of rice (**Oryza sativa** L.). **Starch/Starke** 38(4); 1986; 114-117

The structure and properties of endosperm starch from high-amylose mutants of rice were examined. The starch in the mutants was characterized by a higher content of amylose and loosely branched amylopectin with longer chains compared with non-mutant starch. The starch granules in the mutants showed high temp. of gelatinization and a type B pattern in X-ray diffractometry. These properties were similar to those of amylose-extender (**ae**) starch or maize. The effect of locations where rice plants were grown on the endosperm starches of one high-amylose mutant and a non-mutant was also investigated. AS

1690 Morrison (WR) and Nasir Azudin (M). Variation in the amylose and lipid contents and some physical properties of rice starches. **Journal of Cereal Science** 5(1); 1987; 35-44

The starches of 14 waxy and 17 non-waxy rice var. were studied. Their respective amylose contents (0-2.3 and 7.2-28.6 g/100 g) and lipid contents (16-60 and 625-1303 mg/100g) varied independently of their gelatinisation temp. (67.3-72.0 and 63.7-78.2 C) and enthalpies (12.8-16.0 and 9.3-16.1 J/g). Starches from six rice var. of low to intermediate amylose content grown in ten countries in Southern Europe and Morocco exhibited considerable variation in these four parameters that could often be attributed to environmental effects. Significant linear correlations were observed between amylose contents, lipid contents, gelatinization temp. and enthalpies in the majority of the starches from each variety and in all 60 starches, but these parameters could not be used singly or in any combination to predict the viscoelastic properties of the rice after cooking. AS

1691 Villareal (CP) and Juliano (BO). Waxy gene factor and residual protein of rice starch granules. **Starch/Starke** 38(4); 1986; 118-119

Residual protein of rice starch granules prepared from milled rice by protein extraction with sodium dodecylbenzene sulphonate or alkaline protease treatment was related to amylose content. SDS-polyacrylamide disc gel electrophoresis confirmed that the major protein in nonwaxy starch granules was the waxy gene product with subunit mol. wt. of about 60,000 daltons.The waxy gene product was absent in waxy starch granules. AS

Wheat

1692 Daussant (J) and Renard (HA). Development of different Alpha-amylase isoenzymes, having high and low isoelectric points, during early stages of kernel development in wheat. **Journal of Cereal Science** 5(1);

1987; 13-21

Alpha-amylases in developing wheat kernels (cv. Bastion) were studied by electrophoresis, isoelectric focusing and immunochemical techniques. Two electrophoretically heterogeneous groups with different antigenicities were identified. The first group (pI around 4.5) corresponds to the classical 'green' Alpha-amylase whereas the second group has a pI above 10, i.e. much higher than the pI (around 6.5) of the 'malt' Alpha-amylase, the major constituent of germinated seeds. Both groups were located essentially in the pericarp of developing seeds. The low pI form was detected in the maternal tissues, prior to anthesis, whereas the high pI form was identified at a later stage, about 11 days after anthesis, just before the level of low pI enzyme was at its max. Upon further development of the grain, the high pI form disappeared more rapidly than the low pI form. AS

1693 Dexter (JE), Preston (KR) and Kilborn (RH). Milling and baking qualities of some Canadian wheat classes alone and in blends with Brazilian wheat under Brazilian processing conditions. **Canadian Institute of Food Science and Technology Journal** 20(1); 1987; 42-49

A mill flow was developed for the GRL pilot mill to produce flour comparable in quality and extraction rate to that produced by Brazilian mills. Canadian wheat classes were compared for milling and baking quality, alone and in blends with Brazilian wheat. When milled as mixed grists with Brazilian wheat all the Canadian wheats extended flour extraction rate; the soft Brazilian wheat gave an extraction rate of 76% compared to means of 79% and 78% for mixed grists containing either 50% or 30% Canadian wheat, respectively. No 1 Canada Western Red Winter wheat gave the best milling performance of all the Canadian wheats tested. Because of its relatively soft texture, HY 320 was the least effective of the Canadian wheats in improving milling performance when blended with Brazilian wheat. No. 3. Canada Western Red Spring wheat and No. 1 Canada Utility (CU) wheat were most effective in improving dough strength in blends with the weak Brazilian wheat. Remix bread quality of flours produced from mixed grists of Canadian wheat with Brazilian wheat all were superior to the Brazilian wheat flour, particularly in the case of CU wheat blends. AS

1694 Du Cros (DL). Glutenin proteins and gluten strength in durum wheat. **Journal of Cereal Science** 5(1); 1987; 3-12

An electrophoretic study of the glutenin proteins of durum wheat was undertaken using 102 breeding lines to investigate possible associations between these proteins and gluten strength. The low-mol. wt. glutenin polypeptides were found to be highly correlated with gluten strength. In contrast, the high-mole. wt. (HMW) glutenin polypeptides were found in general to be poor indicators of viscoelastic properties. However, the presence of the lowest-mobility HMW band appeared to have a positive effect on gluten strength. Breeding lines that contained gliadin band 42 and had intermediate dough strength instead of the dough weakness normally associated with this gliadin, were all found to contain this HMW glutenin polypeptide, which was not present in other lines examined. AS

1695 Gaines (CS), Miller (RE), Donelson (JR) and Bean (MM). Optimizing grinder type and methods of expressing wheat meal particle size for wheat texture (hardness or softness) measurement and near-infrared reflectance spectroscopy. **Cereal Chemistry** 64(1); 1987; 46-49

The grinding characteristics of three wheat grinders (LabConco, Falling Number KT-3303, and Udy cyclone) were compared by measuring the particle size of meals produced, using four sieving techniques and five Microtrac laser light-scattering optical measurements. Seven wheat samples used in the evaluation represented a wide range of texture (hardness or softness). The LabCongo-ground meals were coarser than the others, and samples were best differentiated by sieving the meals to determine particle size distribution or means as an assessment of wheat texture. Meals produced by the Falling Number grinder were of generally intermediate particle size distribution, and samples were best differentiated by analyzing meal particle size with the Microtrac instrument. The Udy cyclone produced meals having much finer mean particle size, more narrow particle size distributions, and overall the best differentiation among wheat samples (using the Microtrac). Therefore, the Udy/Microtrac combination was the best procedure for evaluating the texture of wheat samples with equal, if not better, statistical power than a (more coarse) grinder and sieving combination commonly used for particle size index testing. AS

1696 Hashimoto (S), Shogren (MD) and Pomeranz (Y). Cereal pentosans. Their estimation and significance. I. Pentosans in wheat and milled wheat products. **Cereal Chemistry** 64(1); 1987; 30-34

Water-soluble, enzyme-extractable, and total pentosans were estimated in whole wheat and laboratory-milled wheat products by the orcinol-HCl method. The enzyme-extractable pentosans were estimated after treatment with a multi-components system of **Trichoderma viride**. Total pentosans were estimated after hydrolysis with 2N HCl at 100 C, neutralization, and fermentation with fresh, compressed baker's yeast. Whole wheat contained 0.90, 2.45, and 8.95%; wheat flours 0.70-0.83%, 1.66-1.86%, and 1.50-2.12%; and milling by-products 1.29-1.68%, 2.14-4.45%, and 9.90-28.39%, soluble, enzyme-extractable, and total pentosans, respectively. The least significant differences in wheat and milled wheat products at the 0.05 level of significance were 0.192, 0.363, and 1.28 for the soluble, extractable, and total pentosans, respectively. AS

1697 Huebner (FR) and Bieta (JA). Improvements in wheat protein analysis and quality prediction by reversed-phase high-performance liquid chromatography. **Cereal Chemistry** 64(1); 1987; 15-20

Some of the problems in wheat gluten protein analysis by the above method were identified and the solutions to the problems discussed. MVG

1698 Kulkarni (RG), Ponte (JG) and Kulp (K). Significance of gluten content as an index of flour quality. **Cereal Chemistry** 64(1); 1987; 1-3

Gluten content is an important factor in assessing flour quality. In this study, 40 samples of hard red winter and 17 samples of hard red spring wheat flours were analyzed for wet and dry gluten contents using the Glutomatic 2200 gluten washing system. Statistical analysis showed high correlation coeff. (0.92-0.97, $P < 0.05$) between wet and dry gluten values and protein content. Correlation coeff. between farinograph absorption and gluten were greatly improved when starch damage was included as a factor. Correlations for whole wheat glutens with flour protein, whole wheat, and gluten and farinograph parameters were higher when the whole wheat flours were sieved first. AS

1699 Nadeau (DB) and Clydesdale (FM). Effect of acid pretreatment on the stability of citric acid and malic acid complexes with various iron sources in a wheat flake cereal. Journal of Food Biochemistry 10(4); 1986; 241-257

Citric acid and malic acids iron chelating ability was evaluated under two different conditions to determine whether acid incubation might increase the potential bioavailability of these iron sources in a wheat flake cereal. The results suggest that a substantial increase in potential bioavailability of an iron source, particularly elemental iron powders, can be obtained if it is first introduced to an appropriate chelating at low pH, incubated and then neutralised prior to fortification. The study also revealed that citric acid was more effective than malic acid in solubilising under simulated intestinal conditions, it would make the more successful chelator. The complex forming incubation might be considered as a practical technological compensation for the poor bioavailability of fortification iron often observed in many high fibre foods. MVG

1700 Nyman (M), Bjorck (I), Hakansson (B) and Asp (N-G). Popping of whole-grain wheat. Effects of dietary fibre degradation in the rat intestinal tract. **Journal of Cereal Science** 5(1); 1987; 67-72

The fermentative breakdown of dietary fibre in raw and popped whole-grain wheat products was investigated by using rat balance dietary experiments. The faecal excretion of total dietary fibre was 74% with raw wheat, compared with 58% with the 'severely' popped product. The increased fermentability, could be partly related to an increased proportion of soluble fibre, but also to the formation of acid-insoluble material, which was easily degraded by the microbial flora. This material was formed during popping and, on analysis, appeared as Klason lignin. It consisted mainly of Maillard reaction products formed from protein. Thus, Maillard products may contribute to the apparent dietary fibre content in processed cereals. AS

Wheat flour

1701 Okada (K), Negishi (Y) and Nagao (S). Studies on heavily ground flour using roller mills. II. Chemical alteration of proteins, particularly globulin, during dough mixing. **Cereal Chemistry** 64(1); 1987; 3-8

The chemical alteration of proteins, mainly globulin protein, in overground flour during dough mixing was studied. The results showed that the conformation of flour protein was changed by overgrinding and mixing thus making denaturation of flour protein by frozen storage easier. It was also suggested that globulins might play an important role as binders between proteins during mixing thus affecting the rheological properties of the dough. MVG

1702 Shogren (MD), Hashimoto (S) and Pomeranz (Y). Cereal pentosans: Their estimation and significance. II. Pentosans and breadmaking characteristics of hard red winter wheat flours. **Cereal Chemistry** 64(1); 1987; 35-38

The study reveals that water absorption and loaf volume potential (and indirectly mixing time) are governed by protein content and quality, pentosan content and extractability and their interactions. MVG

Wheat starch

1703 Russell (PL), Gough (BM), Greenwell (P), Fowler (A) and Munro (HS). A study by ESCA of the surface of native and chlorine-treated wheat starch granules. The effects of various surface treatments. Journal of **Cereal Science** 5(1 ; 1987; 83-100

Electron Spectroscopy for Chemical Applications (ESCA or XPS) was used in an exploratory study of the surface of prime starch granules from the soft wheat cultivar, Brigand. Native and chlorine-treated starches were examined before and after secondary treatments with Pronase, amyloglucosidase, methanol or toluene. The X-ray photoelectrons, representative of a 5 nm surface shell (approx. 0.135% of total sample volume), were used to quantify carbon, oxygen, nitrogen, phosphorus, sulphur, chlorine and silicon. The surface shell contained approx. 2.5, 1 and 3% respectively of the total nitrogen, phosphorus and added chlorine, and was enriched in these elements by factors of about 19-, 7- and 24-fold respectively, relative to bulk analyses. The atomic composition was used to deduce a plausible mol. model for the surface, as a landscape of starch polymers with a scattering of proteins and phospholipids. The effects of the secondary treatments on the surface content of nitrogen and phosphorus were consistent with a close association between the phospholipids and some of the proteins. The surface chlorine was covalently bonded to carbon within this lipoprotein fraction, and the sulphur within the proteins was oxidised by the chlorine treatment. AS

MILLETS

Corn

1704 Brenner (PE), Richmond (P) and Smith (AC). Aqueous dispersion rheology of extrusion cooked maize. **Journal of Texture Studies** 17(1); 1986; 51-60

The effects of twin screw extrusion cooking of maize grits at different high moisture contents are described. Starch granules survive in the extrudate at high extrusion moisture or with a low shear screw configuration. The aqueous dispersion rheology of the milled extrudate and its dependence on shear rate and heat treatment is explained in terms of the starch swelling behaviour and solubility. These data resemble that of raw maize most closely for the low shear screw configuration. For the high shear configuration under similar conditions of moisture, temp. and mechanical energy dissipation, starch granules are not seen and the dispersion rheology is markedly different from that of raw maize. AS

1705 Landry (J), Paulis (JW) and Wall (JS). Chromatographic and electrophoretic analysis of zein heterogeneity. **Journal of Cereal Science** 5(1); 1987; 51-60

Zein, purified from maize inbred W64A, was chromatographed on a column of hydroxypropylated Sephadex G-100 equilibrated with 75% ethanol containing 0.01 M HCl. The fractions obtained were examined by polyacrylamide gel electrophoresis in the presence of sodium dodecyl sulphate or acid-urea before and after reduction of disulphide bonds. M_r 22,000 polypeptides, free of M_r 24,000 polypeptides, were isolated from the proteins that were eluted last and were compared with total zein by two-dimensional electrophoresis consisting of isoelectric focusing in the first dimension and acid-urea gel electrophoresis in the second. The M_r 22,000 fraction consisted of at least nineteen proteins exhibiting microheterogeneity. These data indicate that zein comprises two sets of closely related polypeptides that exist free or as oligomers, mainly dimers. AS

Corn starch

1706 German (H) and Mueser (F). Energy flow and energy consumption of a corn starch factory. Starch/Starke 38(4); 1986; 109-114 (De).

The energy flow as well as the energy consumption related to the production of main and by-products were ascertained in a corn starch factory. Based on primary energy, the factory under investigation used 69.3% natural gas and 30.7% current. The production of starch, glucose syrup, germ oil, gluten and other by-products made up, after the internal energy conversion, 84.6% of the primary energy used. This amount of net energy was made up of 30.2% electricity, 0.5% current for lighting, 46.8% steam heat and 7.1% heating gas. The steeping and evaporation of the steeping water required 15.8%, the starch extraction and purification 10.8%, the drying of the starch 11.9%, the glucose syrup production 12.7%, while the production of germ oil, gluten and other by-products required 22.0% of the primary energy used. The amount of heat recovery was about 4.4%. When the energy consumed for agricultural production as well as the transportation of corn and its products was taken into consideration, the cumulative primary energy consumed for the production of corn starch amounted to 12060 MJ/t and for the production of gluten to 9520 MJ/t on a dry matter basis. AS

1707 Schirmer (MA), Toledo (MCF) and Reyes (FGR). Effect of food ingredients on the viscosity of phosphate monoesters of corn starch. **Starch/Starke** 38(4); 1986; 124-128

The influence of sodium chloride, sucrose and pH on the pasting characteristics of corn starch phosphate monoesters (CSPM) with different degrees of substitution (D.S.) were investigated. The SPM with D.S. of 0.055 showed a marked decrease of the initial viscosity with an increase of sucrose concn. upto 55%. The opposite effect was observed for the CSPM with D. S. of 0.113 and 0.147. All the SPM presented a higher final viscosity with an increase of sucrose concn. A significant decrease of the initial viscosity and of all other pasting characteristics was noted in the presence of sodium chloride. The phosphated starches were not stable in acidic medium and showed some reduction of their pasting characteristics in alkaline medium. AS

Sorghum

1708 Doherty (CA), Waniska (RD), Rooney (LW), Earp (CF) and Poe (JH). Free phenolic compounds and tannins in sorghum caryopsis and glumes during development. **Cereal Chemistry** 64(1); 1987; 42-46

Caryopses and glumes of sorghum cv. varying in type (I, II, or III), and pericarp and glume colours were analyzed for easily extractable (free) phenolic compounds (FPC) and tannins at 15 stages of maturity, from anthesis through maturity. Max. levels of FPC were observed at immature stages of development (5-22 days after anthesis). Levels of FPC in mature caryopses were significantly less than in developing caryopses. Apparently, the phenolic compounds were increasingly bound to cellular components during maturation. Sorghums with a pigmented tests, dominant spreader gene, and darker pericarp and glume colours contained more FPC and tannins than other sorghums. Sorghums with higher levels of FPC generally had increased weathering and midge resistance. AS

1709 Evans (DJ), Schussler (L) and Taylor (JRN). Isolation of reduced-soluble protein from sorghum starchy endosperm. **Journal of Cereal Science** 5(1); 1987; 61-65

A water-soluble protein has been isolated from total kafirin prepared from sorghum starchy endosperms. Its amino acid composition was characterised by a high proportion of proline (25 mol. %) and cysteine (6 mol. %) and low amounts of aspartic acid and lysine (< 1 mol. %). Sodium dodecyl sulphate-polyacrylamide gel electrophoresis showed the protein to comprise a major and a minor band with apparent M_rs of 28,000 and 49,000 respectively. This protein has been called reduced-soluble protein because its method of isolation, amino acid composition and apparent M_r of its predominant component are almost identical to those of the reduced-soluble protein found in maize. AS

PULSES

1710 Cloutt (P), Walker (AF) and Pike (DJ). Air classification of flours of three legume species: Fractionation of protein. **Journal of the Science of Food and Agriculture** 38(2); 1987; 177-186

The effect of changing the cut point of a laboratory air classifier on the protein fractionation into the fines was studied on the flour of two var. each of cowpea (**Vigna unguiculata**), faba bean (**Vicia faba**) and pigeon pea (**Cajanus cajan**). Of the three species, the highest fines protein content (56.5-62.7% N x 6.25 over the range of cut points studied) and protein recovery (44.2-86.5% over the range) was for one var. of faba bean. The other var. of faba bean showed lower values. Fines from cowpea and pigeon pea flour contained protein contents in the range 26.5-46.8%, depending on cut point, with protein recoveries of 28.3-63.5%. Plots of dry wt. yield vs. protein content of fines indicate that once the relationship between these two parameters has been established for a given species (or, in the case of faba bean, for var.), then the protein content of fines can be predicted from dry wt. yield. AS

Beans

1711 Protector (JR) and Watts (BM). Development of a Modified Mattson Bean cooker procedure based on sensory panel cookability evaluation. **Canadian Institute of Food Science and Technology Journal** 20(1); 1987; 9-14

The Mattson bean cooker (MBC) is widely used to measure relative cooking times of bean samples, but MBC values have not been related to values determined by sensory evaluation. In order to obtain instrumental values that reflected sensory assessment of cookability, MBC plungers of four wts. and two tip diameters were tested. Plots of per cent beans cooked versus cooking times, produced by the 48 g 5 mm diameter MBC plungers, corresponded closely to the cookability curves resulting from evaluation by a trained, nine member sensory panel. The optimum cooked point, as identified by this panel, was 93.75%. This corresponded to the drop of the twenty-third plunger for the 25 plunger model of the MBC (92% cooked point or CT_{92}). MBC CT_{92} values gave better discrimination among freshly harvested navy bean samples than did the commonly employed CT_{50} values. AS

Broad beans

1712 Al-Shabibi (MMA) and Al-Mashikhi (SAE). Ergosterol content in relation to fungal spoilage of broad bean in storage. **Canadian Institute of Food Science and Technology Journal** 20(1); 1987; 50-52

Fungal spoilage of broad bean seeds (**Vicia faba**) was studied. Ultraviolet spectrophotometric studies of the unsaponifiable matter showed strong absorptions at 294, 284 and 274 nm for samples obtained from infected beans, indicating substantial amounts ergosterol. Thin layer chromatography studies also revealed that the amount of ergosterol was established as an indicator of fungal spoilage by gas liquid chromatography when its concn. exceeded 10% of the total plant sterols in the unsaponifiable fraction of bean oil. AS

1713 Youssef (MM), Abd El-Aal (MH), Shekib (LAE) and Ziena (HM). Effects of dehulling, soaking and germination on chemical composition, mineral elements and protein patterns of faba beans (**Vicia faba** L.). **Food Chemistry** 23(2); 1987; 129-138

Dehulling, soaking and germination effected significant changes in the chemical composition of whole faba beans. Dehulling significantly increased the contents of Cu, Zn and K while it significantly decreased the levels of Fe, Mn, P, Ca, Mg and Na. Whole beans soaked for 12 h and then dehulled, had higher amounts of Fe, Cu, Zn, Ca and Na and much lower level of K than unsoaked dehulled beans. Germination significantly increased the levels of all the minerals except Zn. There was no obvious change in the electrophortic pattern of the proteins when the beans were soaked for 12 h. Further soaking for 4 h caused the disappearance of one band in the region of MW 67 KD. New bands were observed when the beans were germinated for 3 days along with the disappearance of some of the old bands. OES

French beans

1714 Kermasha (S) and Van De Voort (FR). Conversion of linoleic acid hydroperoxide by French bean hydroperoxide isomerase. **Journal of Food Biochemistry** 10(4); 1986; 285-303

The presence of hydroperoxide isomerase in the cotyledons of germinated French bean seeds was demonstrated, the compound was characterised its activity as a function of pH and the isolation and identification of any carbonyl compounds resulting from its action on linoleic acid. MVG

Peas

1715 El-Refai (AA), Gouda (MS) and Ammar (KA). Effect of processing and storage on protein and lipid composition of peas. **Food Chemistry** 23(2); 1987; 117-127

The effects of processing and storage of green peas (P. **sativum** L.) at different temp. on the protein and lipid contents were studied for six months. Blanching had very little effect on protein or protein amino acids whereas free amino acids were greatly reduced. The total protein content was not affected immediately after bottling and canning, though that of free amino acids decreased much more than the protein amino acids. The free amino acids decreased in all samples stored for six months at different temp. Total lipids of fresh peas were not affected by blanching, bottling and canning or by storage for six months. However, glycolipids showed an increase on storage and phosphatides, decrease. Same trend was observed with monogalactosyl diglycerides and digalactosyl diglycerides. OES

1716 Manan (F), Hussain (T), Alli (I) and Iqbal (P). Effect of cooking on phytic acid content and nutritive value of Pakistani peas and lentils. **Food Chemistry** 23(2); 1987; 81-87

The effects of a traditional domestic cooking procedure on the phosphorus/phytate relationship and the nutritional quality of three var., of Pakistani (a) peas and (b) lentils were investigated. A cooking procedure which involved steeping, followed by boiling, of the seeds resulted in (a) a reduction of considerable amounts of phytic acid from both peas (82% reduction) and lentils (76% reduction), and (b) an improvement in the net protein utilization, true protein digestibility and biological value of the legume seeds. No apparent relationship was observed between the loss of phytate from the seeds and the improvement of nutritional quality which resulted from the cooking procedure. AS

Winged beans

1717 Omachi (M), Homma (S) and Fujimakim (M). Triacylglycerol composition of winged bean **(Psophocarpus tetragonolobus)**. **Journal of Nutritional Science and Vitaminology** 33(1); 1987; 49-54

Winged beans were extracted with hexane and the extracted lipid was analyzed by HPLC for its triacylglycerol (triglyceride) composition on a Lichrosorb RP-18 column with acetonitrile-tetrahydrofurandichloromethane (6:2:1) solvent mixtures. The chromatography yielded more than 21 peaks, and each triacylglycerol was analyzed for fatty acids by GLC. The major triacyglycerols were found to be behenoyl-linoleoylglycerol (21.3%), trioleoylglycerol (10.5%) and behenoyl-dioleoylglycerol (15.6%). Winged bean oil was found to contain triacylglycerols of larger ECN (equivalent carbon number) than soybean oil. AS

OILSEEDS AND NUTS

Groundnuts

1718 Nagaraj (G) and Kailash Kumar. Location variations in the aflatoxin content of some Virginia groundnut varieties. **Journal of the Oil Technologists" Association of India** 18(3); 1986; 89-91

Aflatoxin B1, B2 and G1 content of seven Virginia groundnut var. (S 230, Kadiri 1, Kadiri 3, Karad 4-11, M 13, GAUG 10 and TMV 10) grown in Chintamani, Jalagaon, Junagadh and Khargaon (India) areas during 1982 kharif season were determined after harvest. Aflatoxin B1 was predominant (0.8 to 65.8 µg/kg) in all var. of groundnut grown in all places, B2 being absent in Khargaon grown var. and was present in smaller quantities in groundnuts grown in other locations. Aflatoxin G1 present at lower concn. in Chintamani, Jalagaon and Khargaon (0.8-29.4 p.p.b.) while it was absent in Junagadh samples. Among the var. S 230 showed highest aflatoxin (49.8 to 85.9 µg/kg) at all the locations, followed by GAUG 10 (15.0 to 88.3 µg/kg) and Kadiri 3 (17.8-106.7 µg/kg); Karad 4-11 had low level (1.6 to 30.3 µg/kg) of aflatoxin at all the four locations followed by Kadiri-1 with 4.0-52.0 µg/kg aflatoxin. Var. with lower phenolic content had more aflatoxin content; var. with > 25% protein contained more aflatoxin. KAR

Illipe nut

1719 Kershaw (SJ). Heterogeneity in commercial contractual samples of illipe nut (**Shorea** spp.) **International Journal of Food Science and Technology** 22(1); 1987; 67-72

Illipe nuts (**Borneo tallow nuts**) are oil bearing seeds collected from trees of the genus Shorea which are indigenous to Sarawak and Borneo. The fat extracted from these kernels is used as a cocoa butter substitute or extender. Illipe nuts in commercial samples are usually 1.5-6 cm long and wt. up to 45 g each. Most seeds are split into 3-6 segments and are relatively large compared to most oilseeds. This paper presents some data on commercial analysis of illipe nut for oil contents ranging from 45.6 to 59.7% and FFA in oil contents from 6.2-33.4% (expressed as oleic acid). These results show that oil and FFA may vary considerably like most other crops of this type illipe nut appears prone to develop FFA from many possible causes and these results are of relevance to the analysis of any heterogeneous natural crop. Thus contractual analysis of illipe nut samples for oil and FFA will yield reproducible results provided careful sub sampling procedure is used. This commercial crop reaches consumers in poor condition with high FFA but still the extracted fat is used as cocoa butter substitute and care in proper harvesting, processing and storage of this crop is indicated. NGKR

Rapeseeds

1720 Smith (CA) and Dacombe (C). Rapid method for determining total glucosinolates in rapeseed by measurement of enzymatically released glucose. **Journal of the Science of Food and Agriculture** 38(2); 1987; 141-150

Glucosinolates were hydrolysed with endogeneous myrosinase to liberate glucose by ball-milling whole seed with water. Similar ball-milling with acidified 40% methanol deactivated myrosinase and allowed free glucose in the seed to be measured separately by a glucose oxidase/peroxidase colorimetric procedure. KAR

Soybeans

1721 Gandhi (AP) and Nawab Ali. Studies on soydhal blends and the shelf life of soydhal. **Indian Journal of Nutrition and Dietetics** 23(12); 1986; 356-360

Soydhal was separately blended with starch additives like sago flour and rice flour at 5 and 10% levels as also with dhals of pigeon pea, green gram, black gram, and lentil at 5, 10, 15, 50 and 75% levels to improve the consistency and taste of soydhal. Sago flour at 5% level gives a good product, but at 10% level it becomes pasty. Rice flour at 5 and 10% levels improved the consistency of soydhal. Pigeon pea dhal could be blended with soydhal upto 50% level; at higher levels beany flavour is perceptible. Similarly dhals of green gram, black gram and lentil could also be mixed with soydhal; the resultant mixture was well accepted. Soydhal was stored in metallic containers, cloth bags, jute bags, and polythene bags (400 ω) for 6 months and analysed for moisture content, free fatty acids (FFA) and cooking time. Metallic containers and polythene bags preserved soydhal better; cloth bags and jute bags allowed the moisture to increase. FFA increased in all the storage containers. None of the containers showed insect infestation. Cooking time was increased from 300 to 360 min in all containers except in cloth bag stored samples where it remained 300 min. KAR

Tofu

1722 Beddows (CG) and Wong (J). Optimization of yield and properties of silken **tofu** from soybeans. III. Coagulant concentration, mixing and filtration pressure. **International Journal of Food Science and Technology** 22(1); 1987; 29-34

Preparation of **tofu** with different concn. of coagulant were investigated in the range of 7-14 mm by adding calcium sulphate (a mole. of water) suspended in water (25 ml) at 60 C to the boiled milk extract at 85 C with stirring at 250 rpm. Filtration pressure of 3.06 g/cm^2 was applied and in another experiment stirring speed for coagulation addition (0.4 g) was investigated between 0 and 1000 rpm with a filtration pressures over the range 1-10g/cm^2 were examined using 0.4 g coagulant and stirring at 250 rpm. The bulk yield, protein and solid recovery and texture variations were studied. The optimum calcium sulphate concn. is 9-10 mm for protein yield and texture. The stirring speed during coagulant addition was found to be critical and the optimum for protein conversion, net yield and texture is 240-280 rpm and the optimum filtration pressure is 4-6 g/cm^2. NGKR

1723 Beddows (CG) and Wong (J). Optimization of yield and properties of silken **tofu** from soybeans. II. Heat processing. **International Journal of Food Science and Technology** 22(1); 1987; 23-27

The effects of heating a macerated unfiltering slurry was compared with samples that were heated for 3 min after cold filtering in line with the traditional method. Analysis of the resulting milks showed that the conversion of soybean protein into solubilised form was more effective with hot extraction (89.8%) compared with cold (83.2%) and more solids were removed in hot extraction (75.6% compared with 66.1%). Conversion of these milk solids into **tofu** was quite effective with hot extraction. Stirring during heating was found to be important and also the texture of **tofu** was very good in the range 70-80 C of coagulation temp. when the protein and solids conversion showed max. NGKR

1724 Beddows (CG) and Wong (J). Optimization of yield and properties of silken **tofu** from soybeans. I. The water: bean ratio. **International Journal of Food Science and Technology** 22(1); 1987; 15-21

The beans were analysed for moisture and nitrogen, milk was prepared after washing the beans and macerating with water using blender and filtering the macerations. **Tofu** was later prepared under standard conditions and the curd was evaluated for texture and visual examination. It was found that traditional methods generally use a 10:1 water:bean ratio and in these studies also highest extraction of the protein and the properties of the **tofu** were the best in quality when the ratio of beans; water was 10:1. The texture of the tofu was not improved by a double extraction technique inspite of the increased protein recovery. The time of maceration was found to have pronounced effect on the liberation of protein into the milk. NGKR

TUBERS AND VEGETABLES

Root vegetables

Carrots

1725 Buick (RK) and Damoglou (AP). The effect of vacuum packaging on the microbial spoilage and shelf-life of 'ready-to-use' sliced carrots. **Journal of the Science of Food and Agriculture** 38(2); 1987; 167-175

Onions

1726 Kalra (CL). Harvesting, handling, storage, chemistry and technology of onion (**Allium cepa** Linn) - a resume. **Indian Food Packer** 41(2); 1987; 17-55

The review covers aspects like distribution; production and trade; harvesting methods including drying and curing; handling; long term storage and associated factors like storage requirements, partial drying and ventilated storage, controlled atmosphere storage, and cold storage; physico-chemical changes during storage; green onion storage; chemistry of onions; processing technology for onions including blanching, dehydration, drying of onion rings; and pickled onions. 222 references. KAR

Tubers

Cassava

1727 Arihantana (MB) and Buckle (KA). Cassava detoxication during tape fermentation with traditional inoculum. **International Journal of Food Science and Technology** 22(1); 1987; 41-48

Tape which has a sweet-sour and mildly alcoholic taste and is consumed without further processing as a snack food after frying in oil is a traditional Indonesian fermented food prepared from black rice or from cassava roots and tubers. For the preparation of tape cassava is steamed dusted with fine ragi (dry, flattened circular cakes prepared from rice flour and distinctive spices containing the required microorganisms particularly yeasts and moulds and allowed to ferment for 2-3 days at 25-30 C. The present study was undertaken to evaluate the effects of different levels of ragi on sugars, acidity, alcohol, acceptability and cyanide elimination from cassava roots. It was found that steamed, cooled cassava without ragi developed off-odour with no tape flavour whereas with ragi produced ideal product. The changes in the chemical constituents of tape during 3 days of fermentation were studied for pH, sugar, acidity and alcohol and the optimum pH around 5, sugar about 22-23% and alcohol 2% were ideal for tape from cassava. NGKR

Potatoes

1728 Khan (I), Wahid (M), Sattar (A) and Jan (M). Semi-commercial trials on radiation preservation of potatoes under tropical conditions. **Journal of Food Processing and Preservation** 10(4); 1986; 239-249

Four potato var. Cardinal, Desiree, Multa and Patrones were tested by irradiating at 0.10 kGy and subsequent storage for 2 months at 20 C and ambient conditions (30-45 C). The results revealed that rotting during 2 months was markedly more in potatoes stored at ambient temp. (60-85%) than at 20 C (3-5%) depending on the var. The wt. loss ranged 12-40% at ambient conditions and 4-11% at 20 C. Influence of storage temp. on reducing sugars, ascorbic acid and sensory scores was variable. Radiation treatment inhibited sprouting, slightly increased the rot and ascorbic acid losses, decreased wt. loss and improved the sensory quality of potato chips. In a subsequent semi-commercial trial involving 8 tons of Cardinal and Patrones potatoes carried out at 20 C, there was higher rot (20-45%) and wt. loss (28-51%) in unirradiated than in irradiated samples having rot 17-40% and wt. loss 20-30% during 6 months storage. Effect of radiation and storage was severe on ascorbic acid but negligible on sugars. Sensory quality was improved as a result of radiation treatment. The data on transportation trial showed higher losses in using jute-bags and truck than wooden crates and railway train. The cost economics for food irradiation based on a source strength of 100 kCi was Rs. 60.00 ($4.00) per ton. AS

Potato starch

1729 Bohlin (L), Eliasson (AC) and Mita (T). Shear stress relaxation of native and modified potato starch gels. **Starch/Starke** 38(4); 1986; 120-124

Vegetables

1730 Lane (RH), Neggers (YB), Bonner (JL) and Stitt (KR). Nutrient quality of selected vegetables prepared by conventional and cook-freeze methods. **Journal of Food Quality** 9(6); 1987; 407-414

Selected vegetables (spinach, broccoli, sweet potatoes, and collard greens) prepared in 2.27 kg (5 lb) quantities by boiling, were frozen and stored for six months at -18 C. Zinc, iron, Beta-carotene, and ascorbic acid were determined on the raw vegetable immediately after cooking and after reheating in a microwave oven subsequent to 6 months frozen storage. The greatest nutrient loss occurred for water soluble nutrients during boiling. Nutrient comparison between cooked samples (conventional method) and samples microwaved after 6 months frozen storage (cook-freeze method) indicated that differences existed only in ascorbic acid content of spinach. Data indicated that vegetables prepared by cook-freeze, a method used by health care institutions, were generally equal in nutrient quality to conventionally prepared vegetables. AS

Leafy vegetables

1731 Oteng-Gyang (K) and Mbachu (JI). Changes in the ascorbic acid content of some tropical leafy vegetables during traditional cooking and local processing. **Food Chemistry** 23(1); 1987; 9-17

The ascorbic acid content of six leafy vegetables, commonly consumed in Nigeria and the changes in the vitamin content that occurred during the conventional processing and cooking of the leaves, especially that of **Vernonia amygdalina**, were reported. The initial levels were found to be in the range of 10.3-34.4 mg/100 g of fresh leaves 60-90% losses were observed during cooking. The squeezing and crushing of **Vernonia amygdalina** led to over 50% losses in wash water. 97% of the remaining ascorbic acid was destroyed when the leaves were exposed to the sun during market sale. OES

Amaranthus

1732 Tucker (JB). Amaranth The once and future crop. **BioScience** 36(1); 1986; 9-13

Cabbages

1733 Conner (DE), Brackett (RE) and Beuchat (LR). Effect of temperature, sodium chloride, and pH on growth of **Listeria monocytogenes** in cabbage juice. **Applied and Environmental Microbiology** 52(1); 1986; 59-63

Tomatoes

1734 Rolle (RS) and Chism (GWIII. Isolation of cytokinin nucleosidases from ripe tomato fruit. **Journal of Food Biochemistry** 10(4); 1986; 275-283

Nucleosidase activity which catalyzes the deribosylation of N^6 (2-isopentenyl) adenosine was isolated and partially purified (390-fold) from ripe tomato fruit (**Lycopersicon esculentum** Mill). This enzyme system, exhibits pH optima at 6.0 and 7.5 in both Hepes/NaOH and Tris/HCl buffer. 6-Benzylaminopurine riboside was more rapidly degraded than N^6 (2-isopentenyl), which was more rapidly degraded than zeatin riboside, when cytokinins were used as substrates for activity measurements. AS

1735 Stanley (DW), Thomas (WM), Hincks (MJ) and Schoch (JP). Fiber optic colour grading of whole peeled tomatoes. **Canadian Institute of Food Science and Technology Journal** 20(1); 1987; 38-41

Tomato paste

1736 Mallidis (CG) and Samaras (F). A simple, rapid and sensitive method for monitoring contamination of aseptically processed tomato paste. **International Journal of Food Science and Technology** 22(1); 1987; 59-66

The main groups involved in the spoilage of tomato products are lactic acid bacteria and species of the genera **Lactobacillus** and **Leuconostoc** are the causative organisms of spoilage and it is felt there is a need for a simple, rapid, accurate cheap and sensitive method of monitoring the microbial contamination of the asceptic system as the traditional method requires 72 h for the detection of microbial contamination. Acetoin and diacetyl have been suggested as indicators of the contamination but they are valuable at early stages of growth but useless if bacterial growth is advanced. It was found that with this method it is possible to detect the presence of both homofermentative and heterofermentative lactobacilli within 10-25 h, depending on the level of contamination. NGKR

FRUITS

Aonla

1737 Singh (BP), Singh (IP), Singh (SP) and Kumar (KA). Physico-chemical composition of different cultivars of aonla. **Indian Food Packer** 41(2); 1987; 7-10

Aonla (**Emblica officinalis** Gaertn) cv (Banarasi, Chakaiya Deshi and Harpharori) were analysed for fruit wt. pulp, seed ratio, % edible portion, sp. gr., soluble solids content, acidity, vitamin C, fibre %, total sugars % and % starch and protein. Banarasi cv showed highest fruit wt. of 38.25 g (range 12.10-38.25 g), pulp seed ratio of 11.38 (range 5.20-11.38), % edible portion of 91.92 (range 75.58-91.92) and vitamin C content of 636.8 mg/100 g pulp (range 458.9-636.8 mg 100 g pulp). All the cv. had sp. gr. of > 1.00 and % acidity of 1.94-2.49. Soluble solids content was highest in Deshi cv., in other cv. it ranged from 10.7 to 13.5. KAR

Apples

1738 Del Re (AAM), Molinari (GP), Natali (P), Rondelli (E), Curto (O) and Sozzi (A). Cold storage of apples Washing with detergents to remove pesticide residues. **Industria Conserve** 61(2); 1986; 138-141 (It).

Golden Delicious apples were dipped in an aqueous suspension of combined ethoxyquine, captan, vinclozolin, thiabendazole, thiophanate-methyl and calcium chloride prior to storage for 7 months in controlled atm. at 2 C. At the end of storage the apples were washed with diluted detergent solutions in a pilot plant to wholly or partially removed the pesticide residues. The detergents removed about 80% of captan and 50% of benzimidazole pesticides, but had no significant effect on ethoxyquine. AS

Apricots

1739 Ford (EW) and Steffe (JF). Quantifying thixotropy in starch-thickened, strained apricots using mixer viscometry techniques. **Journal of Texture Studies** 17(1); 1986; 71-85

Starch-thickened, strained apricots were found to exhibit irreversible thixotropy. Shear stress and shear rate were estimated from mixer viscometer data. A structural parameter, yield stress, flow behaviour index and a consistency coeff. were determined to quantify the rate of breakdown and equilibrium structure of the product. The techniques developed in this study are useful in describing the time-dependent behaviour of suspensions because the slip at the wall is minimized. AS

Cherries

1740 Torreggiani (D), Giangiacomo (R), Bertolo (G) and Abbo (E). Research on the osmotic dehydration of fruits. I. Suitability of cherry varieties. **Industria Conserve** 61(2); 1986; 101-107 (It).

The suitability of three cherry cvs. for processing into shelf-stable products by osmotic dehydration was studied. The products obtained were evaluated, both during processing and during six month's storage, by assessing their chemical, physico-chemical and sensory properties. The preserved cherries maintained good flavour and texture, while their colour did not remain acceptable, except for the cv. Vittoria, which proved on the whole the best of the cv. tested. AS

Citrus

1741 Berk (Z) and Mannheim (CH). The effect of storage temperature on quality of citrus products aseptically packed into steel drums. **Journal of Food Processing and Preservation** 10(4); 1986; 281-293

Orange and grapefruit conc. (60 Brix) and orange drink base were filled aseptically into 200 l drums. Orange products could be stored at 2 C for about 18 months with little effect on their quality. However grapefruit conc. could not be held longer than 6-7 months at 2 C and at 15 C for more than a few days. KAR

Grapes

1742 Singleton (VL), Zaya (J) and Trousdale (EK). Caftaric and coutaric acids in fruit of **Vitis**. **Phytochemistry** 25(9); 1986; 2127-2133

Five non **Vitis** species, 28 **Vitis** species, 20 white and 17 red **Vitis vinifera** cv. 6 **Vitis labrusca** cv. and 11 other var. were studied for contents of **trans** and **cis** caftaric and coutaric acids by HPLC under conditions fully protecting against oxidation of berry juices. The components appeared to be genetically determined to a considerable degree. Similar composition was obtained from replicate samples of the same var. In **Vitis rotundifolia** and four non-**Vitis** species these compounds were absent or present only in trace amounts. In other **Vitis** species, the contents ranged from 5 mg/l to 1350 mg/l of caftaric acid and from a trace to 340 mg/l of cautaric acid. In **Vitis vinifiera**, the contents ranged from 16 to 430 mg/l of **trans**-caftaric acid averaging 145 mg/l with no appreciable differences between white and red berries. **Vitis labrusca** and its cv. averaged markedly higher contents and hybrids were generally intermediate with their parent species. The **cis** percentage increased, particularly for coutaric acid with var. arranged in order of decreasing caftaric acid concn. but appeared to reflect environmental rather than genetic influences. The proportion of coutaric acid, however, appeared to vary (3-33% of caftaric acid content in vinifera cv.) by var. and was genetically controlled. MVG

Mangoes

1743 Shridhar (P) and Snankhapal (KV). Bacterial spoilage of canned mango pulp and green garden peas. **Indian Journal of Microbiology** 26(1/2); 1986; 39-42

The investigation undertaken at the instance of a local canning factory showed that the cause for mango pulp spoilage was **Bacillus megaterium** and **B. cereus**, whereas cans of green garden peas were spoiled by **Clostridium pasterianum**, **B. coagulans** and **B. subtilis**. **B. megaterium** was found in 50% of samples whereas **B. cereus** in 25% samples. In another 25% samples both of these organisms were found. **Cl. pasterianum** was present in 58% of the samples while **B. coagulans** was prevalent in 33% samples. Incidence of **B. subtilis** was low (8%). The thermal death point studies showed that treatment for 110 C for 15 min, destroyed all the spoilage organisms. KAR

Papayas

1744 Marfo (EK), Oke (OL) and Afolabi (OA). Some studies on the proteins of **Carica papaya** seeds. **Food Chemistry** 22(4); 1986; 267-277

The chemical composition and the functional properties of the protein isolates and seed meals of **Carica papaya** seeds were reported in detail. OES

1745 Marfo (EK), Oke (OL) and Afolabi (OA). Chemical composition of papaya (**Carcia papaya**) seeds. **Food Chemistry** 22(4); 1986; 259-266

Defatted and undefatted seeds of papaya (**Carica papaya**) were analyzed for proximate composition, some toxicants, sugar composition, mineral content, physico-chemical properties of the seed oil and the fatty acid spectrum of the seed oil. The seed is a rich source of proteins (27.8% undefatted, 44.4% defatted), lipids (28.3% undefatted) and crude fibre (22.6% undefatted, 31.8% defatted). Of the toxicants estimated, glucosinolates occur in the highest proportion. The seed is low in free monosaccharides. Sucrose is the predominant sugar (75.0% of total sugars). Mineral content is generally low. However, Ca and P occur in appreciable quantities (17 340 μg/g and 10 250 μg/g, respectively). The seed oil is low in iodine value (74.8), free fatty acids (0.94%), and carotene (0.02 μg/g). The major fatty acid is C18:1 (79.1%). AS

Peaches

1746 Erbil (HY) and Muftugil (N). Lengthening the postharvest life of peaches by coating with hydrophobic emulsions. **Journal of Food Processing and Preservation** 10(4); 1986; 269-279

The emulsion, (A) paraffin wax + emulsifier + carboxy methylcellulose and (B) beeswax + triethanolamine + oleic acid and (c) bees wax + coconut oil + sodium oleate were used for coating for peaches and the coated fruits were stored at room conditions (21-24 C and 57-63% RH). Coating with emulsions (A) and (B) was not effective in lengthening the shelf life of fruits. However, coating with emulsion (C) slowed down the rate of deterioration and lengthened the shelf life. KAR

Pineapples

1747 Tomasicchio (M), Andreotti (R) and Giogi (A). Partial dehydration of fruits by osmosis. II. Pineapple, strawberries and plums. **Industria Conserve** 61(2); 1986; 108-114

Experiments were conducted on three kinds of fruits (pineapples, strawberries and plums) to determine optimum conditions for osmotic dehydration with regard to dehydrating medium, temp. and fruit-syrup ratio. In addition, experiments on syrup recycling as well as on dehydrofreezing of pineapples and strawberries were performed. Considering dehydration rate and the quality of the finished products, glucose and isomerized glucose syrups proved to be the most suitable dehydrating media. Only in the case of plums did the higher of the temp. used (40 C) promote osmotic dehydration. Of the two fruit-syrup ratios tested, the lower one (1:4) promoted dehydration only for plums. Syrup recycling in osmotic dehydration gave acceptable results only when the syrup was used not more than four times. A comparison of dehydrofrozen products with their frozen counterparts revealed better quality characteristics of the former in the case of pineapples and very similar quality characteristics in the case of strawberries. AS

CONFECTIONERY, STARCH AND SUGAR

Confectionery

1748 Richardson (T). ERH of confectionery food products. **Manufacturing Confectioner** 67(1); 1987; 65-70

Discusses: water activities on some confections; microbiological aspects of water activity; effect of water activity on rancidity, enzymatic and non-enzymatic browning; comparing theoretical and actual ERHs in some confections. BV

Caramel

1749 Anon. Vacuum-steam-caramel cookers. **Confectionery Production** 53(2); 1987; 118

Chocolates

1750 Tscheuschner (HD) and Markov (E). Instrumental texture studies on chocolate. I. Methods of measurement and texture characteristics. **Journal of Texture Studies** 17(1); 1986; 36-50

Instrumental methods to analyze texture of plain chocolates and milk chocolates are reviewed. Using a strength testing apparatus and special measuring cells, a method to determine the compression strength, shear strength and rupture force during adhesion testing are described. By means of a modified penetrometer equipped with a recording device the melting properties were determined. To determine the max. value of size of disperse components a modified precision thickness testing instrument is applied. The methods offer good reproducibility. The influence of some measuring parameters and sources of error are explained. AS

Jellies

1751 Angalet (SA). Evaluation of the Voland-Stevens LFRA texture analyzer for measuring the strength of pectin sugar jellies. **Journal of Texture Studies** 17(1); 1986; 87-96

The Voland-Stevens LFRA texture analyzer was compared to the Tarr-Baker gelometer for its applicability to measuring jelly strength. Both instruments showed a linear relationship between jelly break strength and pectin content. The test results from the two instruments were highly correlated (r = 0.94). The coeff. of variation relative to the overall average of measurement was 5.0% for the Voland-Stevens LFRA and 8.4% for the Tarr-Baker gelometer. The Voland-Stevens LFRA instrument may be equal to or better than the Tarr-Baker gelometer for measuring jelly break strength. It offers the advantage of reduced errors in sample preparation and ease of instrument calibration. AS

1752 Anon. Pectin jellies, the importance of grade strength, pH and temperature. **Confectionery Production** 53(2); 1987; 150, 152, 157

Starch

1753 Biliaderis (CG), Page (CM) and Maurice (TJ). On the multiple melting transitions of starch/monoglyceride systems. **Food Chemistry** 22(4); 1986; 279-295

1754 Mahony (MO). Expanding markets. **Food** 9(1); 1987; 29, 32, 33

This article covers starch products in extruded food; starches used; extrusion processing systems (forming,indirect and direct); choice of ingredients; basic formulations; influence of components on quality and extrusion cooking of confectionery. BV

1755 Tegge (G) and Richter (G). New method for ash determination in starch hydrolysates by measuring of conductivity. **Starch/Starke** 38(4); 1986; 137-142 (De).

A conductometric method is described in which sulphate as content is determined indirectly by measuring conductivity in higher concentrated hydrolysate solutions. The studies show that in measuring specific conductivity in hydrolysate samples of a dry substance content of 27 to 30% (refractometrically) a max. of conductivity appears which is unaffected by mineral matter content, ion composition and viscosity on non-conductors. From this diagrams were derived from which sulphate ash content can be estimated. Compared with the gravimetric detn. of sulphate ash, the conductometric method saves time, is more easily applicable and more reliable as to reproducibility of results. AS

Sugar

Fructose

1756 Anon. Crystalline fructose. A breakthrough in corn sweetener process technology. **Food Technology** 41(1); 1987; 66-67, 72

The functional properties of crystalline fructose including the extent of sweetness, synergism with the use of sucrose, flavour enhancement, gel synergy and humectancy. KAR

Glucose

1757 Obretenov (TD), Kuntcheva (MJ) and Panchev (IN). Influence of reaction conditions on forming non-dialyzable melanoidines from glucose and glycine. **Journal of Food Processing and Preservation** 10(4); 1986; 251-268

BAKERY PRODUCTS

Bread

1758 Ahmed (AHR), Chandrasekhara (HN) and Ramanatham (G). The protein quality of sorghum bread 'kisra' enriched with edible defated groundnut flour. **Nutrition Reports International** 35(1); 1987; 205-210

The fermented sorghum based Sudanese staple food "kisra" did not promote growth in albino rat. Incorporation of 30% edible groundnut flour in the blend produced significant ($P < 0.05$) improvement in protein content and protein quality. Values of NPR (3.54) and PER (1.94) were obtained for kisra made of 70% sorghum meal and 30% groundnut flour as compared to NPR (2.1) and negative PER recorded for conventional sorghum **kisra**. The biological value (BV), net protein utilisation (NPU) and true digestibility(TD) of sorghum **kisra** (54; 48; 89% respectively) were significantly ($P< 0.05$) enhanced (69; 66; 95% respectively) with **kisra** prepared from enriched blend. AS

1759 Bartnik (M), Jakubczyk (T) and Zarnecka (M). The effects of different high protein ingredients on the hydrolysis of phytate during breadmaking. **Journal of Cereal Science** 5(1); 1987; 29-34

The effects of different high protein ingredients - vital gluten, defatted soy flour, soy isolate, whole milk powder and Na caseinate - on hydrolysis of phytate in wheat flour dough were investigated. A decrease in phytate hydrolysis was observed in the dough containing all this protein ingredients except milk powder. No hydrolysis of phytate occurred in the dough containing milk powder. AS

1760 Dixit (H), Shukla (SS), Shrivastava (A) and Sharma (YK). Nutritional potential of market and soyfortified bread. **Indian Journal of Nutrition and Dietetics** 23(12); 1986; 361-365

Bread was prepared from whole wheat flour or by adding soy flour at 5, 10, 20% levels to refined wheat flour. The moisture content in soy fortified bread was higher (30.98 to 35.26%) than the marked bread (29.15 to 31.71%). At higher levels of soy flour, the oil content of soy bread increased. Market bread had a protein content of 11.03-11.65% and in soy fortified bread the protein content was 12.09 to 16.27%. Addition of soy flour increased the tryptophan and lysine content but not the methionine content. Total ash content was higher in brown and soy bread compared to market bread. The Ca and Fe contents were increased significantly in the soy fortified bread of 5% (39.65 and 4.84%) 10% (45.56 and 4.48%) and 20% (63.61 and 5.05%) of soy flour. KAR

1761 Krishnan (PG), Chang (KC) and Brown (G). Effect of commercial oat bran on the characteristics and composition of bread. **Cereal Chemistry** 64(1); 1987; 55-58

White wheat flour was substituted with 10 and 15% levels of commercial oat bran to determine the effects on dough properties and bread quality. Particle size of bran was also varied in the formula. Protein and dietary fiber analyses were conducted along with other assays to determine the efficacy of supplementation. Product acceptability was judged by sensory evaluation. Absorption requirements in oat bran doughs increased with increases in bran levels as well as with bran particle size reduction. The 10% blends (large and intermediate size bran) produced doughs of good stability. Both 10 and 15% bran blends increased dough mixing time slightly over the control. The inclusion of bromate in the formula improved loaf volume, grain, and texture of oat bran breads. Dietary fiber and protein increased significantly with bran supplementation. No improvement in discriminant computed protein efficiency ratio was noted. The 10% bran breads had better loaf volume, grain, and texture than 15% bran breads. A taste panel preferred 15% bran bread (large bran) and 10% bran bread (intermediate bran). AS

1762 Nawab Khan, Rashida Zaman and Manzoor Elahi. Effect of processing on the phytic acid content of wheat products. **Journal of Agricultural and Food Chemistry** 34(6); 1986; 1010-1012

The effect of processing on the phytic acid content of wheat and wheat products, has been discussed. There is a significant reduction of phytic acid during the dough resting period and during the baking of local leavened and unleavened flat breads (such as **chapatti**, **roti** and **nan**), the highest reduction of 84.62% being during baking of **nan**. Addition of sodium bicarbonate to the dough of **nan** reduces the loss during the dough resting period to 19.23%. Roasting of wheat and preparation of wheat porridge (**Dalya**) cause a reduction of 25 and 87.87% respectively. Frying of purees resulted in the loss of phytic acid up to 80-85%. OES

Cakes

1763 Vaisey-Genser (M), Ylimaki (G) and Johnston (B). The selection of levels of canola oil, and an emulsifier systems in cake formulations by response-surface methodology. **Cereal Chemistry** 64(1); 1987; 50-54

Canola oil successfully replaced hydrogenated shortening in layer cakes when used with appropriate levels of water and an emulsifier system of monoglycerides, polysorbate 60, and sodium stearoyl lactylate. Sixteen formulations representing five levels each of oil, water, and emulsifier were selected for preparation on the basis of a modified Box central composite design. Emulsifier level was a critical component of the regression equations for batter sp. gr. baked volume index, Texturometer firmness, and the sensory features of crumb quality, crumb colour, and flavour. Multiple contour maps derived through response-surface methodology showed the acceptability region for various water and oil combinations at different oil levels. Flavour was the limiting factor at all oil levels. Predictions were that cakes containing either 52.5 or 31.5% canola oil would yield acceptable cakes with 8% or more of the emulsifier system in combination with 137% or more water, based on flour wt. However, at the lowest oil level tested (10.5%), higher levels of both emulsifier (9.5%) and water (169%) were required. AS

MILK AND DAIRY PRODUCTS

Milk

1764 Amal De, Sitaram Prasad and Bhattacharya (S). Simplified techniques for estimation of homogenization efficiency. **Indian Dairyman** 39(4); 1987; 187-189

Methods for determining the extent of homogenization of milk using cream rising index, Farral index and turbidity have been simplified and the procedure to be followed in the simplified form is explained. KAR

1765 Badran (AE), Sharaby (MA) and Hassan (GA). Susceptibility of cows and buffaloes to mastitis infection. II. Milk quality and mastitis infection. **Indian Veterinary Journal** 63(12); 1986; 1017-1022

Relationship between susceptibility to mastitis incidence and milk quality of cows and buffalos and the effect of lactation number, stage of lactation and season of the year on milk constituents were studied. Solids not fat (SNF) contents tended to decrease with mastitis infection. Additionally higher chloride and lower lactose contents were obtained in infected quarters than normals. These changes, therefore, were used as indicator of mastitis incidence. It was also found that fat and SNF per cent increased with advanced lactations and late stages of lactation, while chloride-lactose per cent also increased. Seasonal variations also affected these components. MVG

1766 Bucky (AR), Robinson (DS) and Hayes (PR). Enhanced deactivation of bacterial lipases by a modified UHT treatment. **International Journal of Food Science and Technology** 22(1); 1987; 35-40

It has been shown that ultra high temperature treatment of raw milk do not necessarily inactivate lipases produced by psychrotrophic bacteria such as lipase activity remaining in UHT whole milk may cause off-flavours to develop during storage by liberation of rancid short chain free fatty acids from the milk fat. This study was undertaken to determine whether lipases produced by three pseudomonads were deactivated more effectively by a modified UHT treatment than by conventional UHT treatments. The enzymes exhibited 85-88% after heat treatment at 140 C for 5 sec and 82-89% after treatment at 80 C for 10 min respectively. It was found that double heat treatments consisting of either 130 or 140 C for 5 sec. followed by 60-80 C for 3 min. enhanced lipase deactivation by as much as 40% compared with conventional method. Lipase deactivation was non-linear at 60 C following treatment at 140 C for 5 sec. and no substantial additional ion of activity occured at the lower temp. between 5 and 10 min. NGKR

1767 Dabeka (RW), Karpinski (KF), McKenzie (AD) and Bajdik (CD). Survey of lead, cadmium and fluoride in human milk and correlation of levels with environmental and food factors. **Food and Chemical Toxicology** 24(9); 1986; 913-921

Lead, cadmium and fluoride were determined in 210 samples of human milk and the mean and median levels and ranges found were 1.04 and 0.55 ng/g (range <0.05-15.8 ng/g) for lead, 0.08 and 0.06 ng/g (range <0.002-4.05 ng/g) for cadmium, and 7.08 and <4 ng/g (range <2-97 ng/g) for fluoride. For mothers taking no fluoride supplements and living in communities with fluoride (1 μg/g) in the drinking water, the mean fluoride level was 9.89 ng/g. Where no fluoride was present in the drinking-water, the mean level was 4.4 ng/g. Geometric means for all non-zero lead, cadmium and fluoride concn. were 0.566, 0.063 and 12 ng/g, respectively. Statistical correlation of levels with some dietary and environmental factors showed that lead levels were most strongly correlated with the age of the house ($P < 0.001$), with maternal exposure to heavy traffic for more than 5 yr ($P = 0.011$), and with coffee consumption ($P = 0.034$). Fluoride levels correlated strongly ($P = 0.007$) with the presence of fluoride in the drinking water. Cadmium levels correlated strongly with exposure to cigarette smoke ($P = 0.005$ if the mother smoked and $P = 0.003$ if the father smoked and the mother did not smoke). AS

1768 Ghatak (PK) and Bandyopadhyay (AK). Heat stability of buffalo milk - a review. **Indian Dairyman** 39(2); 1987; 71-73

This short review covers aspects like definition and measurement of heat stability; influence of pH; influence of additives like salt, aldehyde and sugar, urea, and casein; and influence of processing conditions including preheating, concn. and homogenization. KMD

1769 Griffiths (MW). Use of milk enzymes as indices of heat treatment. **Journal of Food Protection** 49(4); 1986; 696-705

1770 Higgins (AC) and Keogh (MK). Anhydrous milk fat. 2. Hydrolytic aspects. **Irish Journal of Food Science and Technology** 10(1); 1986; 23-34

The conditions of storage at 25 C upto 10 months were studied because the main concern was stability of anhydrous milk fat (AMF) under warm conditions. The effect of various dissolved oxygen levels and natural antioxidants on off-flavour was also studied. AMF and butter samples were partially neutralised by injecting NaOH (3%) solution. Partial neutralisation reduced FFA levels and initial peroxide levels due to elimination of oxidised fatty acids. In neutralised oils peroxide formation (PV) was greater than controls when stored at high dissolved oxygen levels but not at low dissolved oxygen levels. In contrast the rate of oxidised flavour and TBA development decreased in AMF samples possibly due to FFA reduction. Fat losses and Na contamination were higher at the higher neutralisation rate but Na contamination levels were under 10 mg/kg at the lower rate. Neutralisation also reduced the rancid flavour in rancid butter oils to accceptable levels because of significant reduction of short-chain FFAs. Increased levels of water washing increased the removal of Na salts of the fatty acids but not the FFAs themselves. Rancid flavour reduction due to increased water-washing after neutralisation was marginal due to the lower rancid flavour intensity of the fatty acids. MVG

1771 Kapadnis (BP) and Panse (MV). Bacteriological quality of pasteurised milk from Poona city. Indian Journal of Microbiology 26(3/4); 1986; 294-296

40 pasteurised milk (PM) and 20 raw milk (RM) samples were collected from 4 dairies situated in Poona city (India) and the PM analysed for phosphatase, standard plate count (SPC), coliforms and pathogens like Salmonella and Shigella whereas the RM was analysed for methylene blue reduction test, SPC and coliforms. All the PM showed phosphatase test negative, very high SPC ranging from 1 x 10^{6} to 9 x 10` ’ml and coliform count ranging from 23 to 1100/100 ml. No Salmonella and Shigella were isolated from PM. In raw milk, from one dairy 60% belonged to good category while 40% were very poor as per the MBRT; the SPC ranged from 2 x 10^{6} /ml indicating the poor quality of RM. Coliform count in RM ranged from 160 to 1100/100 ml indicating fecal contamination. KAR

1772 Keogh (MK) and Higgins (AC). Anhydrous milk fat. 1. Oxidative stability aspects. Irish Journal of Food Science and Technology 10(1); 1986; 11-22

Samples of anhydrous milk fat (AMF) were chemically and organoleptically assessed during storage. Results suggested that off-flavours produced in the AMF samples were not due to TBA-reactive components (mainly aldehydes) but arose due to compounds such as lactones and ketones produced during non-oxidative reactions. The use of Ronaxan A (to reduce the production rate of peroxide and TBA) at high levels (400 mg/kg imparted a distinct off-flavour to AMF samples. MVG

1773 Keogh (MK) and Higgins (AC). Anhydrous milk fat. 3. Fractionation aspects. Irish Journal of Food Science and Technology 10(1); 1986; 35-46

Dry fractionation of milk fat without solvent is commercially important because the separated fractions have different properties which increase their use range in other foods. In the present experiments fraction were obtained with slip points ranging from 21.0 to 42.0 C. The effect of raw material variability on the fraction was established. The properties of the fractions were described by slip point, yield, crystal size, per cent solid fat and distribution of total fatty acids. MVG

1774 Raghbir Singh. Milk and milk products industry in India. **Indian Dairyman** 39(4); 1987; 149-155

An overview of the milk products industry covering aspects like the growth of the industry after independence during the successive six five yr plans including the operation Flood programme, present state of the industry indicating the different types of milk products produced in the country and the problems faced by the industry due to fluctuations in milk supply, irrational price policy, means of transport and low productivity. KAR

1775 Rodriquez (MH) and Barrett (EL). Changes in microbial population and growth of **Bacillus cereus** during storage of reconstituted dry milk. **Journal of Food Protection** 49(9); 1986; 680-686

Eight brands of retail non fat and whole dry milk were reconstituted and analysed for changes in the predominent bacterial population and for the proliferation of **Bacillus cereus** throughout storage at 30, 20 and 5 C. The results were similar for all brands with **Bacillus** and **Micrococcus** constituting the bacterial population. It was found that the microbial profile of reconstituted dry milk changed significantly over time and that storage temp. determined the eventual microbial composition. **B. cereus** was found to be the omnipresent health hazard in reconstituted that was not properly unrefrigerated. MVG

1776 Schmidt (D), Deeth (HC) and Giles (JE). Reconstitution of reverse osmosis milk concentrate and sensory evaluation of the reconstituted milk. **New Zealand Journal of Dairy Science and Technology** 22(1); 1987; 39-47

Whole milk conc. two fold by reverse osmosis was reconstituted with main water and with main water with additional chlorine, to the level of solids equal to that of the initial milk. Part of the reconstituted milk was skimmed. A sensory evaluation panel was generally unable to distinguish between reconstituted milks (whole or skim) and corresponding controls. KAR

1777 Yousef (AE) and Marth (EH). Use of ultraviolet energy to degrade aflatoxin M1 in raw and heated milk with and without added peroxide. **Journal of Dairy Science** 69(9); 1986; 2243-2247

Raw whole milk was artificially contaminated to contain 1 p.p.b aflatoxin M1. A thin layer of milk (0.1 cm) was irradiated with ultraviolet energy. In the first experiment, milk was held at 90 C for 10 min, cooled to 20 C, and irradiated for 30 min. Amount of aflatoxin M1 decreased equally (56.2 vs. 53.9%) in raw or preheated milk, suggesting no involvement of milk enzymes in degrading aflatoxin M1 by ultraviolet energy. Data obtained when raw milk containing aflatoxin M1 was exposed to ultraviolet energy for 15 to 60 min suggest first order kinetics for the degradation reaction. In another experiment, milk was held at 5, 25 or 65 Degree C while it was being irradiated. Aflatoxin M1 was degraded at all temp. Amount of toxin decreased nonlinearly when temp. at which milk was held was increased. Presence in milk of benzyl peroxide at 0.002% did not change the extent to which aflatoxin M1 was degraded by irradiation. Amount of toxin, however, decreased by 89.0% in milk containing 0.05% hydrogen peroxide as compared with 60.7% for hydrogen peroxide free milk when both were exposed to ultraviolet irradiation for 20 min at 25 C. AS

Milk products

1778 Al-Tahiri (R). Recombined and reconstituted milk products. **New Zealand Journal of Dairy Science and Technology** 22(1); 1987; 1-23

This review covers aspects like developments in the use of recombined milk and in recombined milk technology, developments in reconstituting whole milk powder, factors affecting the heat stability of recombined milk products, heat treatment classification of milk powders, lipolysis of milk fat, and oxidation of milk fat. KAR

1779 Prajapati (PS), Patel (AA) and Gupta (SK). Ingredients for low-fat dairy spreads. **Indian Dairyman** 39(4); 1987; 181-185

Various ingredients that constitute the dairy spreads including the source of fat, source of protein, emulsifiers, emulsifying salts, stabilizers, acidifying agents, colourings and flavourings and preservatives which influence the low-fat (30-50% fat) have been reviewed. KAR

1780 Rajkowski (KT), Peeler (JT) and Messer (JW). Detectability levels of four Beta-lactam antibiotics in eight milk products using the AOAC **Bacillus stearothermophilus** disc assay. **Journal of Food Protection** 49(9); 1986; 687-690

The 50% detectability level (ED50) of the **Bacillus stearothermophilus** disc assay in raw, pasteurized whole, protein-fortified lowfat, lowfat, and skim milks, half-and-half, heavy cream and goat's milk was determined for penicillin G, ampicillin, cloxacillin and cephapirin. Results demonstrate a lower level of detectability with PM agar than with A4 agar for ampicillin, cloxacillin and penicillin. Ranges of detection using PM agar at 64 C were 0.0025 to 0.0042 μ/ml (0.0016 to 0-.0026 μg/ml) for penicillin G, 0.0021 to 0.0042 μg/ml for ampicillin, 0.0030 to 0.0059 μg/ml for cephapirin and 0.0167 to 0.0334 μg/ml for cloxacillin. Liquid penicillinase is recommended when performing the confirmation test for Beta-lactam identification. AS

Butter

1781 Arora (KL) and Kanawjia (SK). Effect of processing on the quality of table butter and ice-cream. **Indian Dairyman** 39(4); 1987; 145-148

This article covers processing aspects which include cream pasteurization, cooling and ageing of cream, addition of break and wash water, hardening in butter preparation, homogenization and pasteurization, cooling and ageing, freezing and hardening for getting quality products. KMD

1782 Emmons (DB), Froehlich (DA), Paquette (GJ), Butler (G), Beckett (DC), Modler (HW), Brackenridge (P) and Daniels (G). Light transmission characteristics of wrapping materials and oxidation of butter by fluorescent light. **Journal of Dairy Science** 69(9); 1986; 2248-2267

1783 McNeill (GP), O'Donoghue (A) and Connolly (JF). Quantification and identification of flavour components leading to lipolytic rancidity in stored butter. **Irish Journal of Food Science and Technology** 10(1); 1986; 1-10

Cheese

1784 Nath (KR) and Kostak (BJ). Etiology of white spot defect in Swiss cheese made from pasteurized milk. **Journal of Food Protection** 49(9); 1986; 718-723

Swiss cheese made from fully pasteurized milk developed white spots during hot room stay. This cheese was bitter and eye development was generally retarded. **Streptococcus faecalis** subsp. **liquefaciens** was isolated in high numbers from the spot; it caused bitterness in milk cultures with complete dissolution of the milk clot. The isolate was inhibitory to propionibacteria and **Lactobacillus fermentum**; carbon dioxide production by **Propionibacterium** was depressed in broth culture in the presence of the **Strep. faecalis** subsp. **liquefaciens** isolate. AS

Cultured milk

1785 Hosono (A), Kashina (T) and Kada (T). Antimutagenic properties of lactic acid-cultured milk on chemical and fecal mutagens. **Journal of Dairy Science** 69(9); 1986; 2237-2242

The antimutagenic properties of milk cultured with **Lactobacillus bulgaricus** and **Streptococcus thermophilus** were examined using streptomycin-depending strains of **Salmonella** in an in **vitro** assay systems. The mutagens utilized for testing included 2-(2-furyl)-3-(5-nitro-2-furyl)acrylamide, 4-nitroquinoline-N-oxide, and fecal mutagenic extracts from cats, monkeys, dogs, and other mammals. Both types of cultured milk exhibited antimutagenic activity of the cultured milk with 2-(2-furyl)-3-(5-nitro-2-furyl)acrylamide and 4-nitroquinoline-N-oxide increased with incubation time but were thermolabile beyond 55 C for 10 min. AS

Ice cream

1786 Goyal (GK), Dharam Pal) and Mann (RS). Dried ice cream mix. **Indian Dairyman** 39(4); 1987; 157-159

The authors describe the various ingredients needed in the manufacture of dried ice cream mix and the processing steps including homogenization, pasteurization, ageing, drying, cooling of powder and packaging and storage. Dried ice cream mix with < 3% moisture could be kept well for 2 yr at 30 C under double gas packing. KAR

Khoa

1787 Rizvi (SSH), Mann (RS) and Ali (SI). A case study of appropriate technology transfer: Development of automated, continuous **khoa** powder manufacturing process. **Indian Dairyman** 39(2); 1987; 63-67

The authors have described a new **khoa** (a paste consisting of 85% milk solids and 15% moisture) manufacturing process (the RMA process) employing the principle of reverse osmosis to get a total solids conc. of 20% followed by passing through scraped surface heat exchanger to heat it to 260-270 C to impart it a typical **khoa** colour and flavour followed by drying in steam heated roller dryer to obtain the powder. Chemical composition and physical properties of the **khoa** powder (containing only 2% moisture) made by this process have been reported. KMD

Milk proteins

Casein

1788 Mohammed (KS) and Fox (PF). Heat and alcohol-induced coagulation of casein micelles. **Irish Journal of Food Science and Technology** 10(1); 1986; 47-55

Investigation of the combined influence of heat and organic solvents on the colloidal stability of casein in milk and modified milk systems showed that addition of small amounts of alcohols to milk significantly reduced its stability towards heat. The alcohol and heat stabilities of milk decreased markedly with increasing hydrocarbon chain length of the alcohol. Addition of EDTA counteracted the destabilizing influence of organic solvents. Preheating milk markedly improved the alcohol and Ca^{2+} stabilities of milk systems but it appears that Beta-lactoglobulin/k-casein complexes formed during heating have no influence on changes in the ethanol stability of casein micelles induced by preheating. AS

1789 Pantulu (PC) and Rama Murthy (MK). Refining of casein prepared from spoiled (naturally soured) milk. **Indian Dairyman** 39(4); 1987; 161-162

No product could be prepared from the naturally, soured milk, due to the off flavour of casein. Attempts were made for washing and extraction of casein using NaOH and HCl; sodium sulphite; sodium silicate, Teepol and Tween-20; Hexane, and trisodium phosphate, sodium sulphite and sodium silicate. The methodology for washing with aqueous solutions involved mixing 1 part of the pulverised casein of 40 mesh thoroughly with 5 parts of the washing solution for 30 min. at 60 C followed by decantation. Among the different chemicals, use of detergent solution consisting of trisodium phosphate, sodium silicate and sodium sulphate proved the most efficienct for refining casein of poor quality and only 10% of fat is removed from the casein by this method. The washed and dried casein could be stored for one yr without reversion of off flavour. The cost of chemicals for refining of casein by this procedure was Rs. 30/100 kg casein. KAR

MEAT AND POULTRY

Meat

1790 Narasimha Rao (D) and Sreenivasamurthy (V). A preliminary study of the effect of urea in the preservation of meat. **Meat Science** 17(4); 1986; 251-265

Dry urea salt was used to denature the activity of enzymes of the meat in order to extend the shelf life of meat by preventing spoilage. Parameters such as ERV, pH and TPC were studied during meat spoilage. Results showed that autolytic changes were responsible for the ultimate spoilage of meat and application of urea extended the microbial lag phase and shelf life. The urea appears to check the autolytic changes in meat and thereby microbial growth was delayed due to the nonavailability of nutrients by autolytic changes. MVG

Beef

1791 Burfoot (D). Effect of thickness and location of minced fat on cooking times and weight losses of composite beef joints. **International Journal of Food Science and Technology** 22(1); 1987; 49-58

The effect on cooking time and wt. loss of the thickness of minced fat located at the surface or centre of a cylinder of lean **M. semitendinosus** was examined. All joints were 160 mm long x 80 mm diameter and cooked in a natural convection oven at 175 C. Joints with minced fat at the surface cooked more quickly than those with an equal thickness or volume of fat at the centre. Percentage wt. losses from the joints with surface, fat were greater than those from joints with the same thickness of fat at the centre but the losses were the same for joints with equal volumes of fat. Cooking time decreased and wt. loss increased with increasing amounts of minced fat. For comparison cylinders of unminced fat were heated; these required much longer to reach 74 C and suffered substantially less wt. loss than the cylinders of minced fat. This showed the need for further work to examine the effect of degree of comminution on the heat penetration and wt. ones from fat. AS

1792 Dempster (JF), McGuire (L), Sherington (J), Brady (EM), Dempsey (P) and Jennings (PV). Bacteriological status of minced beef. **Irish Journal of Food Science and Technology** 10(1); 1986; 61-66

Samples of minced beef (250 g each) were collected from each of five outlets (retail butchers' shops and the meat counter of a supermarket) in four regional areas (Letterkenny, Sligo, Galway, Dublin) on four or five occasions between December 1983 and April 1985 to give a total of 90 samples. They were examined for total count, coliform count (**E. coli**) and salmonellae by conventional methods and the pH of 60 was measured. Results showed that the Galway mince had the lowest total count (log 5.57 g^{-1}) while the Dublin mince had the highest total count (log 8.45 g^{-1}). Suprisingly, the Galway samples were the most faecally contaminated (log 3.71 **E. Coli** g^{-1}) while the Letterkenny samples were the least faecally contamined (log 1.2 **E. coli** g^{-1}). Only 5/90 (5.5%) of the samples were salmonella positive. The pH value of the mince ranged from 5.75 (normal) to 6.85 (high) with a mean of 6.25 (high). Results are discussed in relation to national and international standards (guidelines) for this product. AS

1793 Jones (SDM), Tong (AKW), Martin (AH) and Robertson (WM). The effect of ribbing site on fat thickness measurements and the prediction of beef carcass composition. **Canadian Journal of Animal Science** 66(2); 1986; 541-545

1794 Risvik (E). Sensory evaluation of irradiated beef and bacon. **Journal of Sensory Studies** 1(2); 1986; 109-122

Vacuum-packed beef and bacon were treated with gamma-radiation (1-10 KGy) CO^{60} and stored for 3 months at +4 C. The samples were evaluated by a trained sensory laboratory panel, directly after irradiation, and after 32 months. Samples given 1.0 KGy and higher doses were found to be significant different from nonirradiated samples at both times of testing. A higher intensity of off-taste, rancidity, metallic taste and sweetness, and a lower intensity of juiciness and colour saturation were found in all the irradiated samples. Off-taste and rancidity were found to increase with increasing doses, and were best explained when analyzed by Principal Component Analysis (PCA). AS

Bovines

1795 Bernal (VM) and Stanley (DW). Effect of cooking temperature on the fracture behaviour of pre-rigor bovine **Sternomandibularis** muscle. **Canadian Institute of Food Science and Technology Journal** 20(1); 1987;

56-59

1796 Rowe (RWD). Elastin in bovine **Semitendinosus** and **Longissimus dorsi** muscles. **Meat Science** 17(4); 1986; 293-312

Steers

1797 Garcia (PT), Casal (JJ) and Parodi (JJ). Effect of breed-type on the relationships between interamuscular and total body fat in steers. **Meat Science** 17(4); 1986; 283-291

Mutton

Sheep

1798 Devine (CE), Gilbert (KV), Graafhuis (AE), Tavener (A), Reed (H) and Leigh (P). The effect of electrical stunning and slaughter on the electroencephalogram of sheep and calves. **Meat Science** 17(4); 1986; 267-281

Pork

1799 Jeremiah (LE) and Wilson (R). The effects of PSE/DFD conditions and frozen storage upon the processing yields of pork cuts. **Canadian Institute of Food Science and Technology Journal** 20(1); 1987; 25-30

Effects of frozen storage and differences in inherent muscle quality processing yields of pork cuts under commercial condition, were investigated. The results clearly indicate that both inherent muscle quality of cuts and the decision to use frozen and thawed cuts for processing can materially influence the profitability of pork processing operations. MVG

1800 McCurdy (SM), Jelen (P) and Wood (DF). Protein recovery from mechanically separated pork residue. **Canadian Institute of Food Science and Technology Journal** 20(1); 1987; 53-55

Bone residue resulting from the mechanical deboning of pork was subjected to alkali extraction at pH 10.5, followed by acid precipitation at pH 5.3. In laboratory scale experiments, 11% of the starting protein was recovered in a protein coagulate. In pilot scale experiments, 12 and 6% resp., of the starting protein was recovered in the coagulate when a basket centrifuge or a continuous horizontal decanter centrifuge was used for separation of the solubilized protein from the bone residue. The data are compared to data obtained in a similar study of chicken deboner residue. The use of the basket centrifuge in the pilot scale process greatly reduced the fat level in the final protein product in comparison to the horizontal decanter centrifuge process. AS

1801 Whang (K), Aberle (ED), Judge (MD) and Peng (IC). Antioxidative activity of Alpha-tocopherol in cooked and uncooked ground pork. **Meat Science** 17(4); 1986; 235-249

The effect of Alpha-tocopherol as an antioxidant either in cooked or uncooked fresh ground pork and the combined effect of prerigor processing and Alpha-tocopherol treatment an lipid oxidation in ground pork were studied. The rate of oxidation in cooked ground pork stored at 4 or -20 C and uncooked samples refrigerated for extended periods of time (12 days) was slowed by Alpha-tocopherol. In cooked product stored at 4 C where oxidation development was intense and off-flavours were strong, panelists did not detect flavour differences due to treatments. But in cooked products stored at -20 C sensory results were consistent with TBA analysis. Pre-rigor grinding had no protective effect on lipid oxidation as measured by TBA values in cooked product regardless of storage conditions. During storage of cooked product at 4 C TBA values increased with an increase in internal cooking temp. between 50 and 80 C. At 4 C , internal cooking of 70 C or higher induced a rapid rate of oxidation. AS

Meat products

1802 Reddy (NR), Cooler (FW) and Pierson (MD). Sensory evaluation of canned meat-based foods supplemented with dried distillers grain flour. **Journal of Food Quality** 9(4); 1986; 233-242

Dried distillers grain (DDG) flour was evaluated as an ingredient in canned meat-based foods - beef stew, chili no beans, and hot dog suace. DDG can be supplemented up to 2.0% in beefstew, chili no beans, and hot dog sauce without significant changes in organoleptic characteristics such as appearance, flavour, mouthfeel, and overall acceptability, DDG may be used as a thickening agent along with modified starch in beef stew. In chili no beans and hot dog sauce, DDG can partially or completely replace texturised vegetable protein, soy or wheat flour. AS

Bacon

1803 Ikins (WG), Gray (JI), Mandagere (AK), Booren (AM), Pearson (AM) and Stachiw (MA). N-Nitrosamine formation in fried bacon processed with liquid smoke preparations. **Journal of Agricultural and Food Chemistry** 34(6); 1986; 980-985

Liquid smokes produced less NTHZ (N-nitrosotheazolidine) in fried bacon than the traditional wood smoking process did, though the levels of NDMA (N-nitrosodimethylamine) and NPYR(N-nitrosopyrrolidine) were not significantly affected. An aqueous model system in which the smoke conc. were reached with cysteamine and nitrite accurately reflected the trend in NTHZ concn. in the corresponding fried bacon. NTCA (N-nitrosothiazolidine carboxylic acid) concn. in raw bacon appeared to correlate well with NTHZ concn. in fried bacon. The use of liquid smoke could be considered as a means of lowering N-nitrosoamine in fried bacon. OES

Ham

1804 Pizza (A), Lambertini (L), Pedrielli (R) and Magnani (U). Consistency of cooked ham without added polyphosphates. **Industria Conserve** 61(2); 1986; 124-128 (It).

Slice consistency and cohesion in cooked hams without added polyphosphates, arranged in various classes on the basis of final yield, were measured both by sensory evaluation and by instrumental compression test with an Instron machine mod 1140. The latter measurement, which proved effective for the detn. of consistency in homogenous products such as frankfruters and mortadella, was complicated by the non-homogeneity of cooked ham. In this study a possible means is also suggested to overcome the problem of non-homogeneity in the samples to be analyzed. AS

Sausages

1805 Abo Bakr (TM). Nutritional evaluation of sausages containing chick peas and faba beans as meat protein extenders. **Food Chemistry** 23(2);

1987; 143-150

The amino acid composition, chemical score and nutritional values of three meat sausages containing chickpeas and faba beans were studied. The legumes were included in the emulsion at a proportion of 20% of the meat. Sausage quality was evaluated on the basis of moisture:protein (MP) and fat:protein ratios, which ranged from 3.02:1 to 3.48:1 and from 0.89:1 to 0.95:1, respectively, indicating that the addition of legumes did not affect the nutritional balance of the products. Comparison with FAO/WHO reference pattern showed that all the essential amino acids were present at high levels in all products. The quality of sausages containing legumes was found to be nearly as good as the all-meat sausage with respect to amino acid composition, chemical score, protein efficiency ratio and true digestibility. OES

1806 Palmia (F), Dalliaglio (G), Ghisi (M) and Bergianti (M). Semi-processed meat for the preparation of sausages. **Industria Conserve** 61(2); 1986; 152-155 (It).

By using a semi-processed product, viz. comminuted meat along with other ingredients, to prepare traditional sausage products, the production time has been considerably reduced; the product retains its typical organoleptic characteristics. A detailed description of the process is given; it is followed by a discussion of the process and of its results. KMD

Poultry

1807 Anand (SK), Verma (SS), Pandey (NK) and Mahapatra (CM). Bacterial food poisoning through poultry meat products. **Poultry Guide** 24(7); 1987; 37-38

The article reviews briefly the food poisoning commonly caused by staphylococcal intoxication, salmonellosis, botulism, and perfringens poisoning, after consuming poultry meat. KMD

1808 Mohan Kumar (OR). Rigor mortis and keeping quality of meat. **Poultry Guide** 24(6); 1987; 47-49

Basic facts pertaining to the onset and disappearance of rigor mortis along with the factors influencing the development of rigor mortis in slaughtered animals have been presented. KMD

Chickens

1809 Anon. Collaborative studies of methods for the detection of residues of monensin in chicken tissues. **Analyst** 111(9); 1986; 1089-1093

Some published methods for the detection of residues of monensin in chicken tissues were examined. In some instances the limits of detection claimed by the authors could not be achieved. A method was evaluated in which the monensin was extracted from the tissues with methanol, partitioned into carbon tetrachloride and then purified on a silica gel column. Monensin was determined in the eluate from this column by TLC. Alternative procedures for detecting the monensin on the TLC plate by bioautography or by formation of a fluorescent derivative are given. AS

1810 Waimaleongora-Ek (C) and Chen (TC). Effects of frying, shortening quality, holding conditions and reheating on selected flavour volatiles of deep-fat fried chicken parts. **Poultry Science** 65(11); 1986; 2043-2050

Broiler parts were fried in fresh, used, or extensively used shortening. Major flavour volatile contents of the shortenings and the fried parts were analyzed. The extensively used shortening had higher $(P < 0.05)$ unsaturated and total carbonyl contents than the fresh shortening. Parts fried in shortening with high carbonyl contents resulted in high carbonyl contents in the skin and coating portions of the fried parts, while no effect was detected in the meat. Extended shortening usage did not increase the hydrogen sulphide content of the shortening; however, breast meat from parts fried in fresh shortening were higher in hydrogen sulphide than those fried in used or extensively used shortening. Shortening quality had no effect on the methyl hydrogen sulphide and free ammonia contents of fried chicken. Holding fried chicken at 60 C for 3 h, 2 to 4 C for 24 h or -18 C for 24 h did not alter the tested volatiles. Reheating refrigerated and frozen chicken parts also has no effect on the carbonyl and hydrogen sulphide contents except in skin and coating portions of the frozen parts. The methyl hydrogen sulphide and free ammonia contents of the refrigerated skin and coating portions decreased $(P < 0.05)$ during the reheating process. AS

Pigeons

1811 Keshri (RC) and Nagendra Sharma. Pigeon for meat. **Poultry Guide** 24(5); 1987; 73-74

This article provides briefly the background information on the desirability of rearing pigeons for production of poultry meat. Aspects covered include the common breeds and var.; nutritive value of pigeon meat; and the yield of meat. KAR

Turkeys

1812 Acuff (GR), Vanderzant (C), Hanna (MO), Ehlers (JG), Golan (FA) and Gardner (FA). Prevalence of **Campylobacter jejuni** in turkey carcass processing and further processing of turkey products. **Journal of Food Protection** 49(9); 1986; 712-717

Distribution of **Camp. jejuni** in turkey carcass processing and the effect of processing on the prevalence of **Camp. jejuni** on ready-to-cook and further processed turkeys are reported. MVG

1813 Grey (TC), Mead (GC), Griffiths (NM) and Jones (JM). Effects of evisceration and storage temperature on changes in meat quality of traditional farm-fresh turkeys. **British Poultry Science e** 27(3); 1986; 463-470

No statistically significant changes in meat flavour or texture was caused by storage of uneviscerated Wrolstad turkeys at 4 C for 10 days. Further storage at -2 C, however, caused a slight but significant change in flavour which became more marked with time in birds that had been eviscerated after the initial period at 4 C. During storage, both eviscerated and uneviscerated birds became slightly tough. Initial holding at 4 C increased the number of psychrotrophic bacteria on the skin by about 10^3 but subsequent changes at -2 C was slight for uneviscerated birds. Eviscerated carcasses contained higher counts than uneviscerated over after storage at -2 C and though off odours were not detected, spoilage appeared to be imminent at the end of 20 days period. MVG

1814 Larsen (JE), Adams (RL), Peng (IC) and Stadelman (WJ). Growth, feed conversion, and yields of turkey parts of three strains of hen turkeys as influenced by age. Poultry Science 65(11); 1986; 2076-2081

Poultry products

Eggs

1815 Bhanu Pratap, Vijendra Kumar and Vidyarthi (VK). Value of poultry eggs in human diets. Poultry Guide 24(6); 1987; 69-72

The average wt. and proximate composition of eggs of seven sp., of poultry birds (viz. chicken, duck, goose, Guinea fowl, pigeon, quail, and turkeys) have been reported. In addition, the authors have also reported in detail the amino acid composition of the protein of hen's egg, as well as the contents of 12 vitamins and 13 mineral elements in hen's egg. KMD

Eggs

1816 Lu (C-L) and Baker (RC). Characteristics of egg yolk phosvitin as an antioxidant for inhibiting metal-catalyzed phospholipid oxidations. **Poultry Science** 65(11); 1986; 2065-2070

SEAFOODS

Crustacea

Crabs

1817 Manu-Tawiah (W) and Haard (NF). Recovery of carotenoprotein from the exuskeleton of snow crab **Chionocetes opilio. Canadian Institute of Food Science and Technology Journal** 20(1); 1987; 31-33

Shell wastes from Snow crab contain about 33 mg% total astaxanthin, 28% protein, 28% chitin, 31% ash and 1% crude fat on a dry matter basis (DMB). Trypsin hydrolysis of shell waste, followed by precipitation of part of the solubilized material with ammonium sulphate, recovered 9% of the dry matter as a lipoprotein fraction. The fraction, called carotenoprotein, included 74% of the crude lipid, 66% of the astaxanthin and 22% of the protein originally present in the shell. The carotenoprotein product contained 239 mg% total astaxanthin, 65% protein (DMB) and was devoid of chitin. Carotenoprotein may find use as a dietary source of colorant and protein for cultured salmonids. AS

Fish

1818 Anand (SP) and Dhawan (RM). Preliminary study on use of marine-cum-farm product solar drier for fish drying. **Research and Industry, India** 31(4); 1986; 361-365

A cabinet type solar drier with 100 cm x 50 cm x 35 cm dimension with an inclined glass cover has been used for drying of fresh fish. The drier has recorded 91 C and 78 C as max. chamber temp. during the summer season in the unloaded and loaded states resp. and the chamber temp. has been lowered to have < 70 C by providing proper outlet. It was found that all var. of fish prior to drying must be dressed, washed, salted and cured since they reduced the moisture content by about 50%. The drier could effect nearly 73% reduction in moisture in about 3 days. The solar dried fish were fairly firm, hard, and free of salt crystals except that they slightly got cooked during the drying process due to the slightly higher temp. of 40-45 C in the chamber as against the optimum temp. of 35 C. KAR

1819 Kamaraj (G) and Venkateswaran (PK). Improved drying of fish using solar energy. **Research and Industry, India** 31(4); 1986; 313-318

Prawn and kavalai (**Clupea sindensis**) fish with an initial moisture content of 90 and 80% resp. were dried in a improvised solar cabinet dryer having a box size of 750 x 750 mm, the top of which was covered by a 3 mm thick window glass sloped at 10 C. Drying was done for 10 to 12 h and the air temp. within the dryer ranged from 36.5 to 64.5 C. In this solar drier the fish could be dried upto 11.6 to 13.6% moisture and at a faster rate than in sun-drying where it could be dried only upto 17.2 and 21.3% moisture for the same duration. Use of such dryers gives more hygienic, tasty and good quality fish compared to sun-drying. KAR

1820 Karunasagar (I), Venugopal (MN), Karunasagar (I) and Segar (K). Evaluation of methods for enumeration of **Vibrio parahaemolyticus** from seafood. **Applied and Environmental Microbiology** 52(3); 1986; 583-585

The efficiency of several enrichment broths in recovering **Vibrio parahaemolyticus** inoculated into fish homogenates was studied. Recovery by the most probable number technique was very low in all the broths, while direct plating on thiosulphate citrate bile salt sucrose agar yielded better recovery. A decrease in the enrichment time to 8 from 18 h did not improve recovery. At concn. exceeding 2.5 g/ml, polymyxin was inhibitory to V. **parahaemolyticus**. AS

1821 Velayutham (P), Jagatheesan (G) and Santhanam (R). Fish sauce - a new and promising byproduct of commerce. **Seafood Export Journal** 29(4); 1987; 24-25

It is proposed that fish sauce could be prepared from trash fish, which constitute about 30% of marine fish landings in India. The sauce could be prepared by slow fermentation of a mixture of whole fish (or its components such as gills, viscera, head, roe, etc.) and salt. It is a clear, straw-yellow to amber coloured liquid, with a fishy odour, salty taste, and cheesy flavour. The concn. of water soluble substances such as peptides and amino acids, varies with the fish sp. used. Daily consumption of 40 ml of fish sauce will supply about 4 g of protein. KMD

Anchovies

1822 Filsinger (B), Sisti (E) and Bergamaschi (NJ). Chemical and sensory assessments in ripened anchovies. **International Journal of Food Science and Technology** 22(1); 1987; 73-76

This paper describes a sensory scale for the evaluation of the quality of ripened anchovies and presents data on the Total Ester Index(TEI) and water activity of ripened products. These data shows that the quality of anchovies varies from batch to batch but this variation cannot be explained by variations in salt:water ratios at the completion of maturation. There is no association between TEI and sensory score. Though the TEI is useful for indicating the progress of ripening it does not predict the quality of the ripened product. NGKR

Carp

1823 Tomioka (K), Kuragano (T), Yamamoto (H) and Endo (K). Effect of storage temperature on the dephosphorylation of nucleotides in fish muscle. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 53(3); 1987; 503-507

The fresh dorsal muscles of carp (**Cyprinus carpio**), Cod (**Gadus macrocephalus** and yellow tail (**Scriola quinqueradiateaeld**) were wrapped with plastic film and stored at -5, 0, 5, 10, 15 or 20 C. At a temp. range from -5 to 20 C, the Arrhenius plot of the dephosphorylation of nuleotides in cod muscle exhibited one break point at around -2 C, the plot of carp muscle at about 5 C, but the plot of yellow tail exhibited two break points at around -2 C and 10 C. KAR

Cod

1824 Samson (AD) and Regenstin (JM). Textural changes in frozen cod frame minces stored at various temperatures. **Journal of Food Biochemistry** 10(4); 1986; 259-273

Cod frame mince (5 mm drum holes) was stored at -40 C for various periods of time and then transferred to -7 and -14 C for further storage. Samples were evaluated by means of a panel which measured raw springiness and cohesiveness scores. Expressible moisture was measured in both the centrifuge and the Instron. Relaxation time of sample at 50% compression as measured with the Instron. DMA was also measured. The results indicated that expressible moisture and relaxation time first increased and then decreased. The samples stored at lower temp. decreased sooner than samples stored at higher temp. After extensive storage (> 3 months), the transfer of samples from -40 C to -7 and -14 C did not cause any increases in the measured values of springiness and cohesiveness for the samples. This suggests that changes in springiness and cohesiveness may no longer have been taking place. DMA measurements, however, continued to change even after 5 months suggesting that total DMA may not be measuring the same effects as the panel measured. AS

Mackerels

1825 Pan (BS), Kuo (JM), Luo (L-J) and Yang (H-M). Effect of endogenous proteinases on histamine and honeycomb formation in mackerel. **Journal of Food Biochemistry** 10(4); 1986; 305-319

Mackerel muscle homogenate treated with visceral trypsin-like proteinase was found to contain higher free histidine and histamine than that of an untreated sample by a difference of 120 p.p.m histamine after 8 days at 4 C; 500 p.p.m after 24 h at 28 C; and 205 ppm after 4 h at 37 C. The contents of histamine and free histidine were both found to be higher in ungutted mackerel than in gutted ones, When mackerel fillets were treated with muscle alkaline proteinase and heated, it produced maximal increase insoluble peptides at 60 C. Honeycombing appeared in the cooked fillet previously treated with muscle alkaline proteinase, while no honeycombing was observed in the control. Cooked mackerel fillets previously incubated with mackerel pyloric collagenase at 25 C and 55 C resulted in increases in free hydroxyproline. The release of hydroxyproline increased with prolonged incubation at 25 C but stayed constant at 55 C , which was probably related to the optimal temp. of collagenase being 25 C . Honeycombing was not noticeable in the cooked fillet previously incubated with or without collagenase at 55 C for 6 h. Extended incubation to 20 h at 55 C showed honeycombing in both control and collagenase-treated fillets. The possible roles of pyloric collagenase and muscle alkaline proteinase in honeycombing are discussed. AS

Sardines

1826 Navarro (MP), Castrillon (AM) and Varela (G). Effect of frozen storage on protein quality of sardines. **International Journal of Food Science and Technology** 22(1); 1987; 77-80

In this paper studies on rats were carried out on the effects of frozen storage and additives on sardine pastes upon the digestive and metabolic utilisation of its protein using nitrogen balance technique. It is shown that after six months frozen storage the digestive utilization of the protein of sardine paste did not change and the additives produced very different detrimental effects in the frozen pastes. The nutritive value of the protein was well preserved and showed only small changes in biological value after frozen storage for six months whereas the use of additives resulted in marked deterioration. NGKR

Whitefish

1827 Graham (PP), Hamilton (RS) and Pierson (MD). Influence of brining procedures on salt content and distribution in smoked whitefish chubs. **Journal of Food Processing and Preservation** 10(4); 1986; 295-309

Fish products

Surimi

1828 Anon.. Net value. **Food** 9(1); 1987; 47, 49

Considers surimi manufacture (Japanese fish product) and marketing. BV

Prawns

1829 Govindan (TK). Impact of Govindan effect on water extractable and non-protein nitrogen fractions in iced prawn muscle. **Seafood Export Journal** 19(5); 1987; 33-35, 37-40

The "Govindan Effect" relates to the loss of water-extractable constituents from the muscles of fresh fish held in ice. The author has presented six figures (graphs) to show that the mathematical formulae worked out for fresh fish are applicable also to prawns (whole, or headless, or peeled and deveined) held in ice. It is evident from these figures that water extractable N and non-protein N lost from the prawn muscle during storage in ice follow definite mathematical functions providing further proof for the theory enunciated by author. KMD

1830 Shaban (O), Ochiai (Y), Watabe (S) and Hashimoto (K). Quality changes in Kuruma prawn during frozen and ice storage. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 53(2); 1987; 291-296

Kuruma prawn (**Penaeus japonicus**) was kept frozen at -20, -30,,-40, -50, -60 and -80 C for 9 months or stored in ice for one wk. During frozen storage at -20 and -30 C expstored drip increased from 22% at the start to 41% after 9 months, and tyrosine content from 5 mg/100 g at the start to 15 mg/100 g after 7 months. The pH of the muscle showed little increase. In contrast all the parameters did not change significantly at or below -40 C . From these results, it was concluded that -40 C is reasonable to keep the quality unchanged for long term storage, though -20 C is low enough for a short term storage upto a few months. KAR

Sea cucumbers

1831 Ke (PJ), Smith-Lall (B), Hirtle (RW) and Kramer (DE). Technical studies on resource utilization of Atlantic sea cucumber (**Cucumaria frondosa**). **Canadian Institute of Food Science and Technology Journal** 20(1); 1987; 4-8

Potential harvesting methods, several handling techniques and some drying processes of Atlantic sea cucumbers are described. MVG

PROTEIN FOODS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Wines

1832 Bakker (J) and Timberlake (CF). The mechanism of colour changes in aging port wine. **American Journal of Enology and Viticulture** 37(4); 1986; 288-292

Colour density, total pigment, colour, total sulphur dioxide and total and free aldehyde were monitored during aging of port containing varying amounts of aldehyde and sulphur dioxide. The initial colour increase in port is attributed to interactions of free aldehyde with anthocyanins and other phenolics. Free aldehyde is the residual or net concn. resulting from consumption of aldehyde in the reactions producing colour, formation of aldehyde by coupled oxidation of ethanol, and liberation of free aldehyde from aldehyde-bisulphite adducts by oxidation of sulphur dioxide in a port containing a large excess of sulphur dioxide, aldehyde content and colour density (corrected for temporary bleaching by sulphur dioxide) remained unchanged but total pigment colour decreased indicating aging by reactions not involving aldehyde. Colour changes are interpreted in terms of two competitive reactions, viz. aldehyde-induced reactions superimposed upon direct condensation of anthocyanins with other phenolics. AS

1833 Bui (K), Dick (R), Moulin (G) and Galzy (P). A reverse osmosis for the production of low ethanol content wine. **American Journal of Enology and Viticulture** 37(4); 1986; 297-300

The possibilities of using the reverse osmosis process for the production of low alcohol content wine without having to add water are described. Two reverse osmosis systems were employed. The first was equipped with ethanol permeable membranes and the second with selective ethanol-retention membranes. The permeate-exchange ensures the water and ethanol balance of the system. The product intended for manufacture by the proposed technique remains 'wine' by its composition and organoleptic quality. AS

1834 Franta (BD), Mattick (LR) and Sherbon (JW). The analysis of pentoses in dry wine by high performance liquid chromatography with post-column derivatization. **American Journal of Enology and Viticulture** 37(4); 1986; 269-274

A method was developed for measuring pentose concn. in wine by high performance liquid chromatography (HPLC) with post-column derivatization using tetrazolium blue (TZB). Detection of the reduced TZB was at 520 nm. Many potential interferences were avoided because the method is specific for reducing compounds. Sample preparation is very short, and separation is achieved in about an hour on an Aminex HPX-87P monosaccharide analysis column, a cation exchange resin crosslinked with lead. The concn. of the pentoses xylose, arabinose, and ribose and of the hexoses glucose, fructose, and rhamnose were determined. The method is only applicable to dry wines because relatively large glucose concn. affected the quantification of xylose. The method had a detection limit of at least 0.3 g for each sugar and at least to 0.15μg for xylose. The linear range extended to 2.4 μg for each of the sugars except fructose, which was linear only to 1.2μg. Two dry red wine samples were run, and the concn. of the six sugars were determined. The xylose concn. was estimated in one sample because the concn. of glucose was about 19 times greater than the xylose concn. The second wine sample appeared to have an interfering peak eluting with glucose and xylose. Therefore, their concn. were also estimated. AS

1835 Ossa (EM) and Galan (MA). Salt effect on the vapour-liquid equilibrium of wine. **American Journal of Enology and Viticulture** 37(4); 1986; 253-258

The effect of calcium chloride, cobaltous chloride, cupric chloride and NaCl on the vapour/liquid equilibrium of the main constituents of wine has been studied in a concn. range of 0 to 9.2 mol/kg calcium chloride, 0 to 1.0 mol/kg cobalt chloride, 0 to 4.9 mol/kg cupric chloride, and 0 to 4.4 mol/kg NaCl. It was observed that as the concn. of salts in wine increases, the equilibria shift toward a vapour phase richer in volatile components, increasing the separation facilities. Also, a possible catalytic effect has been found for the cupric chlride to detect an increased concn. of methyl and ethyl acetates in vapour phase, diminishing the acetaldehyde concn. AS

Non-alcoholic beverages

1836 Koch (HA), Bandler (R) and Gibson (RR). Fluorescence microscopy procedure for quantitation of yeasts in beverages. **Applied and Environmental Microbiology** 52(3); 1986; 599-601

Existing methods for quantitating yeasts in beverages include time-consuming plate counts that detect only living cells and hemacytometer counts that are reliable only at very high concn.(e.g., 10^6 to 20×10^6 cells per ml). The new method described here involves the use of fluorescence microscopy with the fluorescent stain aniline blue to differentiate yeasts (and other fungi) from backgrounds for easy counting and also may be used in conjunction with membrane filtration to conc. yeasts from liquids before cell enumeration. Recoveries averaged 91.5% for beverages spiked with levels of 500 to 600,000 organisms per ml. The correlation coeff. of count to spike level was 0.996. AS

Coffee

1837 Hostmark (AT), Spydevold (O), Lystad (E), Haug (A), Eilertsen (E) and Bjerkedal (T). Coffee drinking, plasma lipoproteins and fecal cholesterol excretion in the rat. **Nutrition Reports International** 35(2); 1987; 317-324

Three groups of male rats were fed for 10 wk the same purified diet, but were given ad libitum either water (group A), instant coffee prepared in strength as recommended by the manufacturer (group B), in double strength (group C). Group C had a reduced level of whole plasma triacylglycerols, and of all VLDL components compared to group A. Amount hepatic triacylglycerols and cholesterol, as well as fecal excretion of cholesterol were also reduced in group C. Similar, but less consistent effects were noted in group B. There was a pronounced dose-related inhibition by caffeine of ^{14}C-acetate incorporation into fatty acids in isolated rat hepatocytes. It is suggested that coffee by its caffeine component can depress hepatic fatty acid synthesis and thereby bring about reduced lipid levels in the liver and plasma, and possibly also reduce fecal cholesterol excretion in the rat. AS

Fruit juices

Apple juices

1838 Baroody (T) and Mclellan (MR). The effects of pH, acidity, and low level sorbate on the shelf life of inoculated apple juice. **Journal of Food Quality** 9(6); 1987; 415-423

A method was derived to predict changes in optical density and changes in the member days to sesory failure for apple juice. Results indicated that apple juice with varying levels of pH and sorbate concn. will have varying effects on the growth of yeasts and ultimately on the shelf life of the juice. Titratable acidity apparently did not have a significant effect over the range studied in the experiment. KAR

1839 Drake (SR) and Nelson (JW). Apple juice quality as influenced by ultrafiltration. **Journal of Food Quality** 9(6); 1987; 399-406

Objective quality of ultrafiltered (UF) apple juice compared favourably to apple juice filtered by conventional plate and frame filtration (PF). Clarity of the UF juice was excellent and remained stable over the entire storage period at 1 or 21 C. UF juice was rated significantly lower in sensory flavour than PF juice. KAR

Citrus juices

1840 Jimeno (A), Manjon (A), Canovas (M) and Iborra (JL). Use of naringinase immobilized on glycophase-coated porous glass for fruit juice debittering. **Process Biochemistry** 22(1); 1987; 13-16

Optimum conditions of assay and kinetic parameters of naringinase immobilized by diazo coupling to arylamine-derivatized glass have been determined when using naringin as substrate. Properties of the enzyme, except for the Michaelis constant, did not change significantly when immobilized. Operational stability of the immobilized derivative in a packed-bed reactor was tested with naringin as substrate. Low-mol. wt. compounds of citrus juices had no effect on the high operational stability shown by the derivative. Packed-bed reactors showed high stability when fed with natural grapefruit juice, but clogging occurred as a consequence of the turbidity and presence of suspended solids in the juice. Clarification of the juice allowed this limitation to be avoided and showed the potential for industrial use. AS

Grapefruit juices

1841 Pino (JA), Torricella (RG), Orsi (F) and Figueras (L). Application of multivariate statistics for the quality classification of single-strength grapefruit juice. **Journal of Food Quality** 9(4); 1986; 205-216

Grapefruit juice volatiles were collected and analyzed by gas-liquid chromatography for 24 samples of commercial single-strength grapefruit juice from different production days and storage conditions. With the help of multivariate statistics, attempts have been made to classify them according to the chromatographic data and sensory evaluation of the juice. The data was analyzed by canonical and cluster analysis. As a typical result, it was found that using three constituents, the samples could be classified into four different quality classes. From the point of view of sensory interpretation, the canonical analysis also proved to be an interesting approach. Of the three more significant constituents, nootkatone and an unknown constituent have positive contribution, while another unknown constituent give a reverse contribution. AS

Orange juices

1842 Fisher (JF) and Rouseff (RL). Solid-phase extraction and HPLC determination of Beta-cryptoxanthin and Alpha- and Beta-carotene in orange juice. **Journal of Agricultural and Food Chemistry** 34(6); 1986; 985-989

A simplified method, using non-aqueous reversed phase (NARP) high performance liquid chromatography (HPLC) is presented for the routine analyses of the major non-polar carotenoids in orange juice. A detailed procedure is given. It seems simple and rapid and requires min. amount of equipment. OES

1843 Trifiro (A), Gherardi (S), Ghizzoni (R) and Castaldo (D). Effect of composition on the rheology of Italian concentrated orange juices. **Industria Conserve** 61(2); 1986; 120-123 (It).

The rheological behaviour of a series of Italian concentrated orange juices with different composition characteristics was determined. All samples exhibited pseudoplastic behaviour. Single-strength orange juices with different pulp contents were also examined. A relationship was found between rheological parametersa nd some analytical data: flow behaviour index n decreased with increasing concn. and pulp content while consistency index k was also related to pectin content. AS

Strawberry juices

1844 Speers (RA), Tung (MA) and Jackman (RL). Prediction of colour deterioration in strawberry juice. **Canadian Institute of Food Science and Technology Journal** 20(1); 1987; 15-18

The rate of colour change from red to brown in reconstituted strawberry juice at temp. of 20, 35 and 45 C was investigated over 12 wks. A model was developed to explain the increase in degradation product concn. using first order reaction kinetics. With this model, the increase in brown colour over time was studied at storage temp. of 35 and 45 C. The loss in red colour was found to follow first order kinetics at 20, 35 and 45 C. The ratio of red colour to brown colour, often referred to as a degradation index, gradually declined with storage time but could not be modeled using empirical methods. Reaction rate constants for both the increase in brown colour and the loss in red colour were higher at 45 than 35 C. The first order model developed was accurate in predicting the rates of brown colour increase at 35 and 45 C and the rates of red colour loss at 20, 35 and 45 C. AS

Tomato juice

1845 Gherardi (S), Bazzarini (R), Trifiro (A), Voi (AL) and Palamas (D). Pre-concentration of tomato juice by reverse osmosis. **Industria Conserve** 61(2); 1986; 115-119 (It).

The results are reported which are obtained in two years' trials with reverse osmosis as pre-concn. step in commercial tomato paste manufacture. After osmotic treatment, tomato juice can be either packed directly or further concentrated up to 28-30 Brix by evaporation. The reduction in processing costs and the improvement of the sensory properties of the product are emphasized. Several samples of tomato juice before and after osmotic treatment and of permeate were analyzed to evaluate the extent of soluble solids losses. The results indicated a very high selectivity of the membranes used towards all the constituents of tomato juice, with the exception of some volatile substances which tended to get lost together with the permeate. AS

Tea

1846 Rogers (NM), Bargmann (RE) and Powers (JJ). Component and factor analysis applied to descriptors for tea sweetened with sucrose and with saccharin. **Journal of Sensory Studies** 1(2); 1986; 137-148

Tea waste

1847 Konwar (BK), Ahmed (HF), Nath (NC) and Das (A). Value of decaffeinated tea waste as a feed ingredient in swine ration. **Indian Veterinary Journal** 63(12); 1986; 1031-1035

Weaned Hampshire piglets of 8 wk of age were fed with decaffeinated tea waste (DCTW) for a period of 140 days at different levels of incorporation in concn. rations (0, 5, 10 and 15%). There were no significant influences in body wt. gain, feed consumption, feed conversion, apparent digestibility coeff. of nutrients and utilisation of nitrogen and minerals due to inclusion of DCTW upto 15% level in the ration. The cost per kg wt. showed that the cost per kg wt. was also lower with pigs fed rations contained DCTW. Results indicated that DCTW can be safely included in growing and finishing pig rations upto 15% level with distinct economic advantage. MVG

FATS AND OILS

Fats

1848 Tahoun (MK). Large agarose-lipase beads for the hydrolysis of triglycerides. **Food Chemistry** 22(4); 1986; 297-303

Candida cylindracea lipase could be immobilized by binding to large agarose beads or by entrapment within polyacrylamide polymer. Large agarose beads, prepared from native agarose, were preferred for their higher binding capacity and easy intact separation for re-use. The agarose-lipase complex is stable for 6 months at 4 C, maintaining 80% of its initial activity despite eight-fold re-use. Consequently, the lipase complex is recommended for semi-continuous hydrolysis of olive oil and milk fat triglyceridefs. The extent of total hydrolysis was 30.8 plus or minus 1.25% for olive oil as against 23.1 plus or minus 0.95% for milk fat. AS

Cocoa butter

1849 Jayachandra (K), Gautama (A), Azeemoddin (G), Atchyuta Ramayya (D) and Thirumala Rao (SD). Laboratory preparation of cocoa butter from indigenous cocoa beans. **Journal of the Oil Technologists" Association of India** 18(3); 1986; 92-93

Max. recovery of 37.5% fat was obtained by steam cooking the cocoa beans followed by pressing for 1 h at 70-80 C and 870 kg/cm^2 pressure. The pressure cake was converted into a fine powder by micro pulverizer. The refined and bleached cocoa fat is very light coloured. Snacks prepared by deep fat frying in laboratory prepared hydraulic pressed cocoa fat showed excellent taste and consumer acceptability. The cocoa powder was similar to market samples and the beverage prepared was relished by the select consumers. KAR

Fatty acids

1850 Wei (CI), Sen (AC), Fukayama (MF), Ghanbari (HA), Wheeler (WB) and Kirk (JR). Reactions involving HOCl or ClO2 with fatty acids under aqueous conditions and mutagenicity of reaction products. **Canadian Institute of Food Science and Technology Journal** 20(1); 1987; 19-24

Vanaspati

1851 Majumdar (S) and Bhattacharyya (DK). Nutritional study of interesterified vanaspati prepared from palm oil and palmolein vis-a-vis hydrogenated vanaspati. **Journal of the Oil Technologists" Association of India** 18(3); 1986; 70-73

The nutritional quality of conventional vanaspati (hydrogenated fat) is compared with that of interesterified palm and palmolein products of comparable characteristics after feeding at 10 to 20% level of dietary fat. Using rats, the nutritional parameters studied are body growth rate and food efficiency ratio against time, different organ wt., lipid levels of plasma, liver and erythrocyte membrane, and fatty acid composition of these lipids. The interesterified fats are nutritionally equivalent to conventional vanaspati. AS

Oils

1852 Achaya (KT). Oilcakes in India. II. Trade and Utilisation **Journal of the Oil Technologists" Association of India** 18(4); 1986; 96-107

Aspects covered in the article include trade in oilcakes and their export from India including the problem of aflatoxins, use of oilcakes within India for feeding ruminants and poultry as also the future possibilities for solvent meals. KAR

1853 Achaya (KT). Oilcakes in India. 1. Production systems and individual oilcakes. **Journal of the Oil Technologists" Association of India** 18(3); 1986; 59-69

The oilseed cakes in India have resumed importance after its use being made in formulation of protein rich foods for feeding children as well as adults. The present review covers the quantities of ghani, expeller and solvent oilcakes produced in the country from some 19 oil bearing materials, availability of some minor oilseeds in India; the characteristics and composition of each oilseed have also been discussed. KAR

Cococnut oils

1854 Nasirullah, Ankaiah (KN) and Nagaraja (KV). Oxidative rancidity in coconut oil with respect to storage variation. **Journal of the Oil Technologists" Association of India** 18(3); 1986; 84-87

Coconut oil stored in brown colour glass bottle at ambient temp. (18-32 C) is found more stable over its counterpart stored in colourless glass bottle. Oxidation effect could not be seen in both these oils up till 28 months of storage. Oil stored at elevated temp. (37 C) developed oxidative rancidity just after a lapse of eighteen months. No conjugation could be detected in these oils at any stage. KAR

Essential oils

1855 Lawrence (BM). Progress in essential oils. **Perfumer & Flavorist** 11(6); 19861; 39-40, 42-48

Covers eucalyptus oil (cineole-rich); lovage oil; carqueja oil; cangerana oil; star anise oil; licorice; snakeroot oil. BV

Orange oils

1856 Matthews (RF) and Braddock (RJ). Recovery and applications of essential oils from oranges. **Food Technology** 41(1); 1987; 57-61

Recovery process, oil yield, and concn. of oil are the aspects covered. KAR

Palm oils

1857 Dar: (RK), Dede (EB) and Offem (JO). The free fatty acids of palm kernel oil damaged by fungi. **Food Chemistry** 23(2); 1987; 139-142

Examination of the free fatty acids and triglycerides of palm kernel oil decayed by fungi shows a significant fall in the level of lauric acid. Considerable differences in levels of free fatty acids are found, suggesting a wide variation in the ability of fungi to use these compounds. AS

1858 Majumdar (S) and Bhattacharyya (DK). Nutritional evaluation of palm oil versus fractionated randomised palm oil. **Journal of the Oil Technologists" Association of India** 18(3); 1986; 74-77

The nutritional quality of palm oil vis-a-vis fractionated randomised palm oil was evaluated in a short term study using rats. The growth rate, coeff. of digestibility of fats, and the lipid content and composition of plasma, liver and heart were compared. Fractionated randomised palm product shows higher coeff. of digestibility, and much lower triglyceride and free cholesterol in plasma. The organ wt. and their total lipid content were found to be similar for the two dietary fat groups. Fractionated randomised palm product can be regarded as superior to palm oil as a dietary fat. AS

Rice bran oils

1859 Holla (KS) and Press (RR). Performance of indigenous catalyst in the plant scale hydrogenation of rice bran oil. **Journal of the Oil Technologists" Association of India** 18(3); 1986; 77-78

Industrial grade rice bran oil hydrogenation using commercial wet reduced and dry reduced Ni catalysts was evaluated on plant scale with 9 t batch size. Dry reduced Ni catalyst has better filtration characteristics and it has lower catalyst consumption of 0.09% (as 100% of Ni) compared to 0.107% for wet reduced catalyst. AS

Sesame oils

1860 Millwalla (RHH) and Subrahmanyam (VVR). Thermal stability of blended oils having sesame oil. **Journal of the Oil Technologists" Association of India** 18(3); 1986; 87-89

Sesame oil (SSO) was blended with groundnut oil (GNO) cottonseed oil (CSO) and safflower oil (SFO) in 1:3 and 1:1 proportion and heated upto 180 plus or minus C for 12 h and the mixed oil characteristics were determined and compared with their respective individual pure oils. The drop in I.V. by heating for 8 h was greater in GNO, CSO and SFO than in SEO. When SEO was blended the I. V. and linoleic acid content changed slowly compared to oils not having SEO. KAR

Soybean oils

1861 Taneja (VK), Sharma (NK) and Wagle (RD). Partial hydrogenation and winterisation of Indian soybean oil. **Journal of the Oil Technologists" Association of India** 18(3); 1986; 79-81

The linolenic acid contained in soybean oil (8%) imparts fishy odour during deep frying. To alleviate this problem, caustic refined bleached soybean oil was subjected to selective hydrogenation to I.V. of around 100 under varying conditions of temp. (110, 130 and 170 C) pressure and type of catalyst (Nysel DM-3 and Harcat DM-2). This partially hydrogenated oil was filtered, caustic refined, bleached and winterised at different temp. Liquid and solid fractions were separated by filtration. The liquid fraction was deodorised, and analysed for linolenic acid content by HPLC. A 90% yield of liquid fraction with 55% reduction of linolenic acid content can be had by selective hydrogenation to I.V. around 110 and winterisation at 10 C. This oil can be used as salad oil, and the solid fraction for vanaspati making or deep fat frying. The partially-hydrogenated oil remains clear at 20 C and can be used without winterisation. KAR

SPICES AND CONDIMENTS

Spices

1862 Sorensen (S). Safe and Sound. **Food** 9(1); 1987; 41, 43

Describes a Danish technique for the effective sterilization of herbs and spices which involves the encapsulation prior to heat treatment. BV

Chillies

1863 Raina (BL) and Teotia (MS). Physico-chemical characteristics of chilli (Capsicum annum L.) varieties grown in Punjab Agricultural University, Ludhiana. **Indian Food Packer** 41(2); 1987; 11-16

Analysis of 19 var. selections of chillies has shown an average unit wt. range of 0.27-0.55 g, average length of 2.70 to 5.46 cm, average growth of 0.70 to 1.18 cm, average number of seeds 31 to 73, % extraneous matter 6.60 to 10.66 and placenta 1.80 to 4.58%. Sun-dried chilli had a moisture content of 5.70 to 10.16%. The total ash varied from 4.30 to 6.43%, total extractable colour from 0.23 to 0.71%, capsaicin content 33.3 to 285.5 mg %, and non volatile ether extract from 9.54 to 16.66%. Total extractable colour was max. (0.71%) in Selection 66-3-10 followed by 0.67% in Selection 46-1. Max. (285-5 mg %) capsaicin content was observed in Selection 116-5 followed by 149.4% in Selection 118-1. KAR

1864 Teotia (MS) and Raina (BL). Evaluation of chillies grown in Punjab. **Indian Food Packer** 41(2); 1987; 81-86

Chillies were collected from 7 chilli growing areas of Punjab (Rajpura, Shahkot, Sunam, Sanauri Red, Malerkotla, Sangrur, and Amritsar) and were analysed for physical and chemical characteristics. Average unit wt. ranged from 0.3 to 0.74 g, seed to pod ratio from 1: 1.60 to 1.2.62, average length from 1.29 to 7.68 cm, average girth from 0.81 to 1.28 cm, average number of seeds/pod 42 to 76, and placenta % 1.74 to 4.16. The range of moisture content was from 5.06 to 10.19%, total ash from 4.60 to 6.54 and acid insolube ash from 0.03 to 0.31. Total extractable colour varied from 0.24 to 0.54 and capsaicin content from 73.3 to 190.0 mg %. Although the non-volatile ether extract content ranged from 9.70 to 22.87%, except 3 samples from Amritsar, all others were within the prescribed limit of 12%. KAR

Garlic

1865 Kalra (CL). Harvesting, handling, storage, chemistry, pharmacological properties and technology of garlic (**Allium sativum** L.) - a review. **Indian Food Packer** 41(2); 1987; 56-80

The aspects covered in the review include post harvest technology of garlic which includes curing, handling, packaging, storage under cold, controlled atmosphere and the changes taking place therein, and inhibition of sprouts, storage diseases and their remedies; chemistry of garlic comprising physical characteristics, individual chemical constituents including carbohydrates, pectic substances, amino acids, vitamins, lipids, pigments, mineral matters/trace elements, and volatile components; antimicrobial properties of garlic; processing technology; products; methods of dehydration and properties of dehydrated products. KAR

SENSORY EVALUATION

1866 Gacula (MCJr), Rutenbeck (SK), Campbell (JF), Giovanni (ME), Gardze (CA) and Washam (RWII). Some sources of bias in consumer testing. **Journal of Sensory Studies** 1(2); 1986; 175-182

The study indicated that the consumers were less critical in their evaluation when the samples being assessed were identified by brand names. Brand identification and package design, when not concealed in the comparison of product contents, resulted in consumer response bias. Also, the popularity of a brand influenced consumer's perception of products. KAR

1867 Jeltema (MA) and Southwick (EW). Evaluation and applications of odour profiling. **Journal of Sensory Studies** 1(2); 1986; 123-136

An odour profiling procedure was developed based on the ASTM odour profiling method. The modified procedure involved using approximately 20 panelists. The results obtained compared favourably to results obtained in the ASTM panel for which 150 panelists evaluated each compound, indicating that a small panel can be used to produce replicable results. KAR

1868 Jewell (K). Sensory analysis by computer. Part 2. **Food Manufacture** 61(12); 1986; 51-53

1869 Kokini (JL). The physical basis of liquid food texture and texture-taste interactions. **Journal of Food Engineering** 6(1); 1987; 51-81

This paper reviews recent efforts to relate liquid and semi solid texture to rheological and frictional properties and to relate texture-taste interactions to diffusion coeff. KAR

1870 Lawless (HT) and Malone (GJ). A comparison of rating scales: Sensitivity, replicates and relative measurement. **Journal of Sensory Studies** 1(2); 1986; 155-174

The relative sensitivies of four scaling methods were assessed in central location tests with untrained judges. The scales included category scales, line scales, magnitude estimation, and a hybrid of the line and category scales. Approximate parity was observed among category scales, line scales and the hybrid scale in their ability to differentiate small physical differences. Magnitude estimation was used as efficiently as the other methods by a college population, but less efficiently by a heterogeneous sample of consumers. Judges used the scales with greater accuracy as they became familiar with the range of products to be judged. In spite of relaatively small physical differences, subjects used wide ranges of the scales, supporting the view that rating scales are relative, not absolute, measuring instruments. AS

1871 Minoz (AM), Pangborn (RM) and Noble (AC). Sensory and mechanical attributes of gel texture. II. Gelatin, sodium alginate and kapppa-carrageenan gels. **Journal of Texture Studies** 17(1); 1986; 17-36

1872 Munoz (AM), Pangborn (RM) and Noble (AC). Sensory and mechanical attributes of gel texture. I. Effect of gelatin concentration. **Journal of Texture Studies** 17(1); 1986; 1-16

1873 Rainey (BA). Importance of reference standards in training panelists. **Journal of Sensory Studies** 1(2); 1986; 149-154

1874 Reynolds (AJ). Sensory analysis by consumer. Part 1. **Food Manufacture** 62(1); 1987; 37-39

Reasons for carrying out consumer tests, different types of consumer tests, the differences between objective and subjective tests, and points for carrying out the consumer tests are outlined. BV

1875 Steenkamp (J-BEM). Perceived quality of food products and its relationship to consumer preferences: Theory and measurement. **Journal of Food Quality** 9(6); 1987; 373-386

This paper investigates theoretically and empirically the meaning of food quality to consumers and the role perceived food quality plays in the formation of consumer preferences. The empirical study involved the product categories margarine/butter and meat products. KAR

FOOD STORAGE

1876 Longstaff (RA) and Banks (HJ). Simulation of temperature fluctuations near the surface of grain bulks. **Journal of Stored Products Research** 23(1); 1987; 21-30

A simulation model is presented that predicts the mean and variation of temp. in the region within 40 cm of the upper surface of grain bulks from a knowledge of the temp. and their variation at > 40 cm and at the surface. It was found necessary to include consideration of convective as well as conductive heat transfer in order to predict temp. to within 1.5 C of observed values for all six sets of test data. Moisture transfer effects were not considered. In four of the six sets consideration of conduction alone gave an adequate description. The model is of the form that can be incorporated as a subroutine into calculations of temp. occurring throughout grain storages. AS

INFESTATION CONTROL AND PESTICIDES

Infestation control

1877 Chander (H) and Ahmed (SM). Laboratory evaluation of natural embelin as a grain protectant against some insect pests of wheat in storage. **Journal of Stored Products Research** 23(1); 1987; 41-46

The effectiveness of natural embelin isolated from berries of **Embelia ribes** is discussed as a grain protectant for wheat in storage. More than 50% mortality of **Sitophilus oryzae** (L.) adults was observed in wheat grains when treated at 0.025% concn. The FI progeny was reduced in treatments. However, productivity (progeny/21 adult-days) in treatments was not significantly different from controls. In the case of **Rhyzopertha dominica** (F.), there was 50% adult mortality at 0.025% concn. after 1 day and 3 months of storage, and both progeny and productivity were reduced significantly at all the concn. After 8 months of storage, only the highest concn. of 0.1% exhibited appreciable adult mortality, yet the FI progeny and productivity were significantly low in all the concn. of embelin. Against larvae of **Corcyra cephalonica** (Stainton) and **Ephestia cautella** (Walker), 0.0125% concn. retained its effectiveness after 8 months, while higher concn. of 0.05 and 0.1% offered good protection against **Trogoderma granarium** Everts larvae. Embelin in the present study did not show any contact toxicity to adults of **S. oryzae** or **R. dominica**. The treatment did not have any adverse effect on germination of wheat seeds. In general, the effectiveness of embelin tested against five insect species was **C. cephalonica** > **E. cautella** > **R. dominica** > **T. granarium** > **S. oryzae**. AS

Callosobruchus maculatus

1878 Credland (PF) and Dick (KM). Food consumption by larvae of three strains of **Callosobruchus maculatus** (Coleoptera: Bruchidae). **Journal of Stored Products Research** 23(1); 1987; 31-40

Differences were observed in food consumption (from cowpeas) by the three different strains of larvae **C. maculatus**. KAR

1879 Giga (DP) and Smith (RH). Egg production and development of **Callosobruchus rhodesianus** (PIC) and **Callosobruchus maculatus** (F.)(Coleoptera: Bruchidae) on several commodities at two different temperatures. **Journal of Stored Products Research** 23(1); 1987; 9-15

The number of eggs laid by **Callosobruchus rhodesianus** (Pic) and **C. maculatus** (F.) on six different legume commodities at 20 and 30 C were counted. Lifetime egg production was higher at 30 C than at 20 C in both species, and **C. maculatus** was generally the more fecund species. Egg production was also significantly affected by commodity, and there were significant interaction effects of commodity with insect species and temp. Egg hatch and percentage emergence varied with commodity and with temp., but there were no significant interactions. Development period was significantly affected by commodity, temp. insect species, and all their interactions. Both insect species were able to develop successfully on five of the commodities, but not on soybean. The significance of the results for the potential spread of **C. rhodesianus** in sub-tropical Africa is discussed. AS

Dermestis maculatus

1880 Golob (P), Cox (JR) and Kilminster (K). Evaluation of insecticide dips as protectants of stored dried fish from dermestid beetle infestation. **Journal of Stored Products Research** 23(1); 1987; 47-56

Treating dried **Tilapia** sp. with deltamethrin gave protection from infestation by **Dermestis maculatus** for 6 months in Lake Turkana, N. Kenya. Deltamethrin had a distinct repellent effect which was also observed with natural pyrethrins. The other insecticide found useful was pirimiphos-methyl for protection of dried fish in store. KAR

Rhyzopertha dominica

1881 Evans (DE). The influence of rate of heating on the mortality of **Rhyzopertha dominica** (F.) (Coleoptera: Bostrychidae). **Journal of Stored Products Research** 23(1); 1987; 73-77

The influence of inlet air temp. on the exposure period required to kill immature **Rhyzopertha dominica** was determined by heating infested wheat in a batch-operated fluid bed. The LT$_{99.9}$ values for 500 and 1000 g loads heated with air at 80 C were 110 and 222 s respectively. Equivalent values for air at 140 C were 25 and 43 s. There was a marked discontinuity in the relationship between 1/LT value and inlet air temp. at about 125 C, with 1/LT value changing more rapidly with air temp. greater than 125 C even though maximal grain temp. were essentially constant. The slopes of the relationships between 1/LT value and air temp. differed with load and, thereby, provided a further indication that rate of heating influences mortality. The grain temp. achieved by such exposures, i.e. 62-73 C, are unlikely to harm wheat, barley and oats of 12% m.c. or less. AS

Pesticides

Fungicides

1882 Annapurna Jetti), Iyengar (DS), Nagabushan Rao (S), Bhalerao (UT) and

The fungicidal activity of Captan, zineb and Benlate and crude extract of **Polyalthia longifolia** leaves have been presented. BV

BIOCHEMISTRY AND NUTRITION

Nutrition

1883 Cook (DA) and Welsh (SO). The effect of enriched and fortified grain products on nutrient intake. **Cereal Foods World** 32(2); 1987; 191-196

1884 Rajammal P Devadas and Parvathi Eswaran (P). Intra family food intake of selected rural households and food consumption patterns of pregnant women. **Indian Journal of Nutrition and Dietetics** 23(12); 1986; 343-346

A survey was conducted with 45 rural households in Madurai district of Tamilnadu (India) by questionnaire method with regard to family size, income, literary level, menu patterns, food practices and habits, food consumption pattern by different members within the family, and food consumption pattern of pregnant mothers. The female head of the family cooked and distributed the food giving priority to the male head and pre-school children. The discrimination in sex for sharing food was done after the age of five. Adequate food was taken only during festive occasions and during harvest seasons. Pregnant mother's food was deficient in cereals, pulses, vegetables and milk. The per capita income of the family was Rs. 51-100 and althoughthe families were non-vegetarian, flesh food were used occasionally due to lack of purchasing power. KAR

1885 Rambaut (PC) and McCormack (PD). Nutritional concerns at the space station. **Activities Report** 38(2); 1986; 5-9

TOXICOLOGY

1886 Ganesh Bhat (B) and Chandrasekhara (N). Studies on the metabolism of piperine: Absorption, tissue distribution and excretion of urinary conjugates in rats. **Toxicology** 40(1); 1986; 83-92

1887 Maxwell (SA), Brown (RFR) and Upshall (DG). The **in vitro** penetration and distribution of T-2 toxin through human skin. **Toxicology** 40(1); 1986; 59-74

1888 Rose (S). Salad days. **Food** 9(1); 1987; 45

Reports on the food poisoning potential of delicatessan salads. BV

Antioxidants

BHA

1889 Ito (N), Fukushima (S) and Tsuda (H). Carcinogenicity and modification of the carcinogenic response by BHA, BHT and other antioxidants. **CRC Critical Reviews in Toxicology** 15(2); 1985; 109-150

Bacteria

Clostridium perfringens

1890 Goldner (SB), Solberg (M), Jones (S) and Post (LS). Enterotoxin synthesis by nonsporulating cultures of **Clostridium perfringens**. **Applied and Environmental Microbiology** 52(3); 1986; 407-412

Chemostat-cultured **Clostridium perfringens** ATCC 3624 and NCTC 10240, and a nonsporulating mutant strain, 8-5, produced enterotoxin in the absence of sporulation when cultured in a chemically defined medium at a 0.084 h^{-1} dilution rate at 37 C. The enterotoxin was detected by serological and biological assays. Examination of the chemostat cultures by electron microscopy did not reveal sporulation at any stage. The culture maintained enterotoxigenicity throughout cultivation in a continuous system. The enterotoxin was detected in batch cultures of each strain cultivated in fluid thioglycolate medium and a chemically defined medium. No heat-resistant or light-refractile spores were detected in batch cultures during the exponential growth. AS

1891 Harmon (SM) and Kautter (DA). Improved media for sporulation and enterotoxin production by **Clostridium perfringens**. **Journal of Food Protection** 49(9); 1986; 706-711

Sporulation of 24 strains of **Clostridium perfringens** isolated from stools of food poisoning patients and normal controls was improved by adding sodium carbonate to Duncan-Strong (DS) sporulation medium and replacing starch with rafinose tin Taniguti's AEA medium: Viable counts of heat-tolerant spores (75 C for 20 min) were 2 to 186 times greater in modified AEA medium and 2 to 169 times greater in modified DS than in DS medium. Reversed passive latex agglutination assays revealed a corresponding increase in enterotoxin titers in supernatant fluids of the 12 enterotoxigenic strains grown in modified AEA medium and in modified DS medium. AS

Lindane

1892 Mandal (A), Chakraborty (S) and Lahiri (P). Hematological changes produced by lindane (Gamma-HCH) in six species of birds. **Toxicology** 40(1); 1986; 103-111

Mycotoxins

Penicillic acid

1893 Speer (M) and Sussmuth (R). Bacterial tests as indicators for the detoxification of the mycotoxin penicillic acid by ammonia treatment. **Food and Chemical Toxicology** 25(1); 1987; 31-34

The detoxification of penicillic acid by reaction with ammonia was examined by means of a polymerase assay using two strains of **Escherichia coli** (pol A^+ and pol A_1^- and are combination assay using two strains of **Bacillus subtilis** (rec and rec^-). A 100-fold surplus of ammonia added to penicillic acid abolished the cytotoxic and genotoxic effects of penicillic acid towards the bacteria under the test conditions. The study presents the possibility of detoxifying mycotoxins in feeds by ammonia treatment and demonstrates the suitability of bacterial assays as indicators for mycotoxins. AS

Quercetin

1894 Crebelli (R), Aquilina (G), Falcone (E) and Carere (A). Urinary and faecal mutagenicity in Sprague-Dawley rats dosed with the food mutagens quercetin and rutin. **Food and Chemical Toxicology** 25(1); 1987; 9-15

The natural flavonoid quercetin was administered to Sprague-Dawley rats by ip injection or gastric intubation of a single dose of 500, 1000 or 2000 mg/kg body wt. Mutagenicity assays with **Salmonella typhimurium** strain TA98 showed moderate mutagenic activity in the urines and faecal extracts but not in plasma samples from the treated animals. The mutagenic activity detected in the urines accounted for about 0.5% of the administered dose, irrespective of the route of administration and the dose level. Higher mutagenicity was demonstrated in faecal extracts. Rutin (quercetin-3-O-rutinoside) was administered by gavage and ip injection at 2000 mg/kg. Although the chemical was inactive as a mutagen **in vitro**, significant mutagenicity was detected in the urines and faecal extracts of the treated rats. Such activity was similar to that detected after administration of free quercetin in a dose some four times lower (by wt). AS

FOOD LAWS AND REGULATIONS

Nil

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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm, cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto- (10^{-15}, as in fCi)
^{o}F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/ pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal, kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg, ml, mm)
m-equiv	milli-equivalent
M	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano- (10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc. normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-(as in µg, µm)
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for al elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

GENERAL

Nil

FOOD PROCESSING

Nil

FOOD PACKAGING

Nil

FOOD ENGINEERING AND EQUIPMENT

1895 Abichandani (H), Sarma (SC) and Heldman (DR). Hydrodynamics and heat transfer in thinfilm scraped surface heat exchangers. A review. **Journal of Food Process Engineering** 9(2); 1987; 143-172

The available literature on hydrodynamics and heat transfer in thin film scraped surface heat exchangers was reviewed and arranged inconcise form. The hydrodynamics covers fluid flow, residence time distribution, power consumption and film thickness. In heat transfer, sensible heating and evaporation aspects are explored. The constraints of various mathematical models are explained. The problems needing further investigation are also delineated. AS

1896 Abichandani (H), Sarma (SC) and Heldman (DR). Hydrodynamics and heat transfer in liquid full scraped surface heat exchangers. A review. **Journal of Food Process Engineering** 9(2); 1987; 121-141

Theoretical and empirical models pertaining to the hydrodynamics and heat transfer in liquid full scrapped surface heat exchangers have been reviewed up to date. In hydrodynamics, various aspects viz. fluid flow, residence time distribution, power requirement are covered. The heat transfer characteristics have been reviewed from stand points of heating, cooling and ultra high temp. applications. The limitations of various models are explained. The logical conclusions and the areas needing further investigations have been discussed. AS

1897 Bartsch (JA), McLaughlin (NB) and Pitt (RE). A computerized control and data acquisition system for a universal testing machine. **Journal of Texture Studies** 17(3); 1986; 315-330

A computer-based data acquisition and control system was built and interfaced with an Instron Universal Testing Machine. The control interface and signal conditioning hardware are described. System performance is described in terms of the time required to complete various crosshead operation commands, and is found to be satisfactory at crosshead speeds slower than 2.5 cm/min. A research application of the system is presented which involves cyclic loading of fresh apple tissue. AS

1898 Jones (PL). Dielectric heating for food processing. **Food Trade Review** 57(2); 1987; 3, 5, 6, 8, 10

1899 Muneta (P), Jasman (R) and Reid (LM). Effect of freezing on nitrite stability in aqueous solutions. **Journal of the Association of Official Analytical Chemists** 70(1); 1987; 22-23

The effects of freezing, chloroform plus freezing, and pH, on nitrite stability have been studied. The loss of nitrite occurring during freezing at pH 6.8 or lower emphasises the sample preservation method in nitrate and nitrite analysis. The pH of the solutions to be analysed should be near pH 11.0 for either frozen or refrigerated storage. Chloroform was effective in preserving nitrite at pH 5.7 and 5 C but not in frozen storage. MVG

ENERGY IN FOOD PROCESSING

1900 Hang (YD). Production of fuels and chemicals from apple pomace. **Food Technology** 41(3); 1987; 115-117

Production of ethanol, biogas, citric acid and edible fibres from apple pomace are indicated. KAR

FOOD CHEMISTRY AND ANALYSIS

Chemistry

1901 Huang (TC), Soliman (AA), Rosen (RT) and Ho (C-T). Studies on the Maillard browning reaction between aspartame and glucose. **Food Chemistry** 24(3); 1987; 187-196

HPLC and column chromatography were used to study the Maillard browning reaction between aspartame and glucose. The aspartame concn. remaining in the reaction mixture after heating were determined by the HPLC method developed in this experiment. The activation energy of this reaction was thus estimated to be 18.89 plus or minus 0.96 kcal mol^{-1}. Four Schiff bases were isolated and purified by the successive application of Sep-Pak C-18 cartridge and Sephadex G-25 column chromatography. By FAB-MS, these four Schiff bases were interpreted as N-(1-deoxy-D-fructo-1-yl)-aspartame, N-(1-deoxy-D-fructo-1-yl)-phenylalanine methylester, n-(1-deoxy-D-fructo-1-yl)-aspartic acid and N-(1-deoxy-D-fructo-1-yl)-phenylalanine, respectively. AS

Chemistry (Analytical)

1902 Ebdon (L), Hill (S) and Ward (RW). Directly coupled chromatography - atomic spectroscopy: Part 2. Directly coupled liquid chromatography - atomic spectroscopy. A Review. **Analyst** 112(1); 1987; 1-16

Review with 100 references. BV

1903 Stonys (DB). Determination of sulphur dioxide in foods by modified Monier-Williams distillation and polarographic detection. **Journal of the Association of Official Analytical Chemists** 70(1); 1987; 114-117

1904 Sullivan (DM), Kehoe (DF) and Smith (RL). Measurement of trace levels of total aluminium in foods by atomic absorption spectrophotometry. **Journal of the Association of Official Analytical Chemists** 70(1);

1987; 118-120

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

Glucoamylases

1905 Laszlo (E) and Hollo (J). Comparative evaluation of immobilized glucoamylases. **Starch/Starke** 38(5); 1986; 168-173

Immobilized enzymes are used today in various industrial technologies, and further widespread application may be expected in the years to come. An essential precondition to this is to compare methods described in the literature for a given enzyme and recently developed immobilization techniques from aspects of economic efficiency. Comparison may be drawn on the basis of results reported in scientific papers. The study of various immobilized enzymes led to the conclusion that only material expenses can be accepted as comparative fundamental data. On the basis of this, immobilized enzymes may be described by calculation and comparison of the following three characteristic values: 1. Specific material costs of immobilization; 2. initial productivity of unit volume of the reactor, or total product formation of the immobilized enzyme applied for one half-life; 3. costs of enzymes in unit product formation. Applicability of the method is presented in the evaluation of amyloglucosidase enzymes. AS

Ethyl alcohol

1906 Tanaka (H), Kurosawa (H) and Murakami (H). Ethanol production from starch by a coimmobilized mixed culture system of **Aspergillus awamori** and **Zymomonas mobilis**. **Biotechnology and Bioengineering** 28(12); 1986; 1761-1768

Methane

1907 Hashimoto (AG). Pretreatment of wheat straw for fermentation to methane. **Biotechnology and Bioengineering** 28(12); 1986; 1857-1866

Microorganisms

1908 Breuil (C), Mayers (P) and Saddler (JN). Substrate conditions that influence the assays used for determining the Beta-glucosidase activity of cellulolytic microorganisms. **Biotechnology and Bioengineering** 28(11); 1986; 1653-1656

Culture filtrates from **Trichoderma harzianum** E 58, **T. reesei** CL 847 and **Pencillium** sp. C 462 were assayed for Beta-glucosidase activity using a range of substrates and sugar analysis methods. Although sugar analyses by the dinitrosalicylic acid (DNS) and Nelson-Somogyi methods gave a similar profile, when increasing conc. of salicin were assayed, considerably higher values were obtained with the DNS assay. The salicin conc. used for the assay greatly influenced the final Beta-glucosidase values with higher values obtained for **T. harzianum** E 58 and **T. reesei** CL 847 at substrate conc. of 1 mg/mL while optimum values for **Penicillium** sp. C 462 were obtained at substrate conc. greater phenyl-Beta-D-glucopyranoside (PNPG) gave the same response as cellobiose. Cellobiose should be used at concn. greater than 3.74 mg/mL to avoid substrate limitation of the Beta-glucosidase assay. AS

1909 Thompson (BG). Electrochemical ion control in batch cultures of **Saccharomyces cerevisiae** NCYC 1018. **Biotechnology and Bioengineering** 28(12); 1986; 1884-1888

Bacteria

Bacillus cereus

1910 Ishida (A), Futamura (N) and Matsusaka (T). **Detection of peroxidase activity and its localization in the forespore envelopes of Bacillus cereus. Journal of General and Applied Microbiology** 33(1); 1987; 27-32

Peroxidase activity was detected in **Bacillus cereus** when the catalase activity has been inhibited by 1 mM sodium azide. The peroxidase level was high in late stationary-phase cells just before the accumulation of dipicolinic acid. Ultracytochemical examination indicated that peroxidase was localized in the envelope around the forespore and in the transverse membrane of the cell. AS

Lactobacillus

1911 Yanagida (F), Suzuki (K-I), Kaneko (T), Kozaki (M) and Komagata (K). Morphological, biochemical, and physiological characteristics of spore-forming lactic acid bacteria. **Journal of General and Applied Microbiology** 33(1); 1987; 33-45

1912 Yanagida (F), Suzuki (K-I), Kaneko (T), Kozaki (M) and Komagata (K). Deoxyribonucleic acid relatedness among some spore-forming lactic acid bacteria. **Journal of General and Applied Microbiology** 33(1); 1987; 47-55

Fungi

Mushrooms

1913 Boeh-Ocansey (O). Low temperature fluidized-bed drying of mushroom, carrot, beef and shrimp samples. **Acta Alimentaria** 15(2); 1986; 79-92

A drying technique at low temp. in a fluidized-bed of activated alumina particles is described. The technique was used to test dry samples of mushroom, carrot, beef and shrimps. The influence of sample dimensions and fluidized-bed temp. on drying time were investigated. A drying regime was developed combining freeze-drying and air-drying operations to produce completely dried and shelf-stable food samples. The quality of these products were compared to that of analogues either completely freeze-dried in vacuo or dried partially by vacuum freeze-drying followed by air-drying. Products dried by the fluidized-bed technique were judged to be of good quality. The use of the atmospheric fluidized-bed drier is projected to result in the production of less expensive dried food samples. AS

1914 Cabanes (J), Garcia-Canovas (F), Tudela (J), Lozano (JA) and Carcia-Carmona (F). L-Mimosine, a slow-binding inhibitor of mushroom tyrosinase. **Phytochemistry** 26(4); 1987; 917-919

It was found that L-mimosine is a slow-binding inhibitor of L-DOPA oxidation by mushroom tyrosinase. This inhibition is characterized by a prolonged transient phase. A mechanism is postulated according to the kinetic data. AS

Yeasts

1915 Doran (PM) and Bailey (JE). Effects of hydroxyurea on immobilized and suspended yeast fermentation rates and cell cycle operation. **Biotechnology and Bioengineering** 28(12); 1986; 1814-1831

Hydroxyurea an inhibitor of DNA synthesis in **Saccharomyces cerevisiae** was used to inhibit growth of immobilised cells. It however failed to restrict the synthesis of macromolecular synthesis immobilised cells, the results obtained clearly showed major changes in cell and fermentation properties. Hydroxyurea induced unbalanced growth rate because the cells maintained different routings of carbon substrate and altered metabolic contents. It was shown that through hydroxyurea caused metabolic shifts paralleling in part those resulting from immobilization, these two different methods for altering yeast kinetics are not equivalent in all respects, showing the multiplicity of cell responses to interference with cell cycle progression. MVG

1916 Huang (YT) and Kinsella (JE). Phosphorylation of yeast protein Reduction of ribonucleic acid and isolation of yeast protein concentrate. **Biotechnology and Bioengineering** 28(11); 1986; 1690-1698

Yeast nucleoproteins were chemically phosphorylated with phosphorus oxychloride. Studies using 31p nuclear magnetic resonance (NMR) spectroscopy, stability to pH and lysine estimation all indicated that the Epsilon-amino group of lysine was the principal functional group phosphorylated. Phosphorylation of ca. 30% of the lysine residues resulted in removal of more than 85% of contaminant ribonucleic acid from protein precipitated at pH 4.2. Phosphorylation did not alter the amino acid composition of yeast proteins and was reversible under acidic conditions. Based on the data, a method for the preparation of phosphorylated yeast protein with low levels of nucleic acid is proposed. AS

1917 Tokuoka (K), Ishitani (T), Goto (S) and Komagata (K). Four new yeast species belonging to the genus Candida. **Journal of General and Applied Microbiology** 33(1); 1987; 1-10

1918 Tubb (RS) and Liljestrom (PL). A colony-colour method which differentiates Alpha-galactosidase-positive strains of yeast. **Journal of the Institute of Brewing** 92(6); 1986; 588-590

5-Bromo-4-chloro-3-indolyl-Alpha-D-galactoside (X-Alpha-gal) has been used as a chromogenic substrate for differentiating Alpha-galactosidase-positive yeast strains on agar media. The method can be applied to monitoring culture purity in breweries which use both ale and lager strains of yeast. AS

1919 Zemek (J), Kadlecikova (B), Kuniak (L), Kucar (S) and Kockova-Kratochvilova (A). Xylose isomerase activity of yeasts and yeast-like organisms. **Acta Alimentaria** 15(2); 1986; 111-121

Isomerization between certain aldo- and keto-sugars due to presence of D-xylose isomerase in some yeasts and yeast-like organisms is described. Among 465 representatives of these organisms almost 20% of the strains tested gave positive reaction on a synthetic selection medium with D-xylose, revealing presence of the enzyme. Considering the price of X-xylose as inducer for xylose isomerase, selection of the strains of xylanolytic activity was carried out. For this purpose selection media consisting of gels prepared from crosslinked derivatives of xylan and synthetic Yeast Nitrogen Base were used. Only 9 strains among the xylose isomerase producers were proved to be simultaneously endo-acting xylanase producers. **Wingea robertsii** was found to be the most suitable xylose isomerase producer. The extent of the isomerase reaction was evaluated radiometrically. Replacement of D-xylose in the production medium by xylan resulted in increasing xylanolytic activity in the medium, the xylose isomerase activity remained, however, unaltered. The harvested and freeze-dried cells of **Wingea robertsii** were permeabilized and immobilized into the crosslinked polyethylenimine matrix. Conversion of D-glucose to D-fructose owing to the unspecificity of the enzyme concerned was studied with (U- ^{14}C) D-glucose as a substrate and with uniformly labelled starch ^{14}C in an enzyme system consisting beside the xylose isomerase of alpha- and gluco-amylase. Concn. of D-fructose in the reaction mixture reached 45% of the total sugars. AS

Hygiene

1920 Makukutu (CA) and Guthrie (RK). Behaviour of **Vibrio cholerae** in hot foods. **Applied and Environmental Microbiology** 52(4); 1986; 824-831

Four food types held hot at 45 to 60 C were deliberately contaminated with 01 and non-01 **Vibrio cholerae** strains. These organisms were assayed for survival and recovery from the foods within 1 h of the time the food was kept hot. The results showed no growth of **V. cholerae** non-01 on thiosulphate-citrate bile-sucrose agar plates after 24 h of incubation at 37 C for food held hot at 50 to 60 C . Growth was low for **V. cholerae** 01 and was not achieved in some instances in which foods were held at either 55 or 60 C after 40 or 60 min or from the time the food was kept hot. Both organisms, however, were recovered equally from all food types held at all temp. after 18 h of incubation. When incubated for an additional 24 h, the organisms grew to unusually small-sized colonies, measuring 0.1 to 0.3 mm in diameter, on the same agar plates that were negative for growth after an initial 24 h of incubation. It was concluded that **V. cholerae** survived the period of time held at hot temp. Although the organisms were not recovered from some foods when held at some of the temp. and times after 24 h of incubation, they remained viable. An incubation period of 48 h at 37 C was found to be appropriate for the recovery of **V. cholerae** from hot foods. AS

1921 Notermans (S), Heuvelman (CJ), Van Egmond (HP), Paulsch (WE) and Besling (JR). Detection of mold in food by enzyme-linked immunosorbent assay. **Journal of Food Protection** 49(10); 1986; 786-791

Evaluation of the enzyme-linked immunosorbent assay (ELISA) for detecting a mold-specific, heat-stable and water-soluble antigen demonstrated the potential of the method for detecting molds in food products. The mold antigen, as produced by **Penicillium** spp. and **Aspergillus** spp., was present in all food samples containing aflatoxin B1. The amount of mold antigen present in the test samples was related in each case to the aflatoxin B1 content. Experiments done with samples artifically inoculated with mycotoxin-producing molds revealed that mold contamination could be detected by ELISA at a very early stage. The min detectable amount of mold mycelium for three different species of **Penicillium** was 38 ng/g of sample. AS

Escherichia coli

1922 Andrews (WH), Wilson (CR) and Poelma (PL). Glucuronidase assay in a rapid MPN determination for recovery of **Escherichia coli** from selected foods. **Journal of the Association of Official Analytical Chemists**

70(1); 1987; 31-34

The study was conducted to determine if recoveries of **E. coli** obtained by a rapid MPN (most probable number) incorporating 4-methylumbelliferyl Beta-D-glucuronide (MUG) into either laryl tryptose (LT) broth or EC medium would equal those obtained by lengthier AOAC methods. MVG

1923 Szabo (RA), Todd (ECD) and Jean (A). Method to isolate **Escherichia coli** 0157:H7 from food. **Journal of Food Protection** 49(10); 1986; 768-772

A direct plating method for direct overnight isolation hemorrhagic colitis (HC) strains of **Escherichia coli** from foods has been developed. The direct plating medium incorporates tryptophan (as tryptone), sorbitol, an indicator and a fluorogenic substrate for diagnostic purposes. The upper temp. limit for growth is raised by inclusion of sodium chloride. A bile salt concn. lower than that usual for **E. coli** but still inhibitory to non-enteric organisms is also used. The blue colonies of the medium become red positive by indole strain. Replicate colonies are confirmed serologically. In contrast, replicate colonies of E. coli Type 1 colonies are yellow and give negative indole reactions. A > 90 C recovery of HC organisms from artificially contaminated beef is obtained by the method. MVG

Salmonella

1924 Ibrahim (GF) and Lyons (MJ). Detection of salmonellae in foods with an enzyme immunometric assay. **Journal of Food Protection** 50(1); 1987; 59-61

The efficacy of an enzyme-immunometric assay (EIMA) was investigated against a standard cultural method (SCM) for **Salmonella** detection in 82 food samples. Cultures of the food samples were assayed by EIMA after preenrichment and again after selective enrichment. Testing of preenrichment cultures by EIMA was unreliable as only 7 **Salmonella**-positive samples were detected. However, full agreement between EIMA and SCM was obtained when the selective enrichment cultures were assayed by EIMA, resulting in the identification of 24 **Salmonella**- positive samples. AS

Vibrio parahaemolyticus

1925 Sakazaki (R), Pivnick (H), Jarvis (G), Goddard (M), Asakawa (Y), Barrow (G), Beuchat (L), Colwell (R), Gleeson (T), Gray (R), Nakanishi (H), Sakai (S), Stavric (S), Takizawa (K), Tamura (K), Twedt (R) and Vanderzant (CWest (P). ICMSF methods studies. XVI. Comparison of salt polymyxin broth with glucose salt teepol broth for enumerating **Vibrio parahaemolyticus** in naturally contaminated samples. **Journal of Food Protection** 49(10); 1986; 773-780

Two media, glucose salt teepol broth (GSTB) and salt polymyxin broth (SPB), were compared for their efficacy in enumerating **Vibrio parahaemolyticus** in naturally contaminated samples using the most probable number (MPN) procedure. Eleven laboratories in four countries participated, six of them using two analysts. One hundred and ninety-six of 335 samples were found to contain V. **parahaemolyticus**. Neither enrichment medium was superior, and both media appeared necessary to prevent false-negative results. There was a high (52.5%) percentage of MPN patterns that were improbable with respect to Poisson distribution in those MPN tubes that yielded V. **parahaemolyticus**. Suspect colonies that developed on thiosulphate citrate bile salts sucrose (TCBS) plates streaked, from GSTB were confirmed (1,438/1,929=75%) about as frequently as when streaked from SPB (2,155/3,038=71%). AS

BIOTECHNOLOGY

1926 Mabbett (T). How biotechnology can improve cocoa quality. **Coffee & Cocoa International** 14(3); 1987; 57, 59

TISSUE CULTURE

Nil

FOOD ADDITIVES

Flavourings

1927 Prabha (TN) and Patwardhan (MV). **In vitro** effect of polyphenols on some enzyme systems. **Acta Alimentaria** 15(2); 1986; 129-35

The effect of phenolic compounds on a few isolated enzyme systems of fruits was studied under in vitro conditions. The effect was more pronounced on succinic dehydrogenase (SDH) and peroxidases (POD). Inhibitory effects of chlorogenic acid, catechol and hydroquinone and stimulatory effect of catechin and gallic acid were noticed for SDH. Ferulic, caffeic and p-coumaric acid showed a high activating effect on POD whereas chlorogenic acid, catechin, catechol, hydroquinone protocatechuic acid, dopamine and gallic acid inhibited the enzyme. Inhibitory effects of hydroquinone, p-coumaric and ferulic acid was noticed on polyphenoloxidase (PPO) enzyme. There was not much effect on polyphenols on enzymes like amino transferases and ATPase. AS

Stabilizers

Gelatin

1928 Swatland (HJ). Fluorimetry of gelatin by fiber optics. **Canadian Institute of Food Science and Technology Journal** 20(2); 1987; 102-103

A bifurcated fiber optic light guide was used to measure the fluorescence of gelatin and boiled tendon collagen. Dry gelatin powder was strongly fluorescent with peak emission at 560 nm when excited at 365 nm. After hydration to form a jelly, emissions above 460 nm were greatly reduced so that the peak emission was at 460 nm. After raw tendon had been heated in boiling water, the peak fluorescence emission (excitation at 370 nm) shifted from around 400 to 430 nm and flourescence emissions were reduced in intensity. AS

Polyphosphates

1929 Jen (CMC) and Shelef (LA). Factors affecting sensitivity of **Staphylococcus aureus** 196 E to polyphosphates. **Applied and Environmental Microbiology** 52(4); 1986; 842-846

The effect of polyphosphates (eight compounds) on growth of **Staphylococcus** aureus 196 E in brain heart infusion broth was studied. The organism was sensitive (in decreasing order) to chain polyphosphates with 21, 3, 13, and 15 PO_4 groups, and bactericidal effects were observed with 0.5% of these compounds. No inhibition was effected by PPi or a metaphosphate. The inhibitory effects were pH dependent, and bacterial sensitivity was highest at pH > 7.4. Initial populations affected the number of survivors. No growth was observed after 24 h at 35 C when the initial cell population was less than 10 CFU/ml, and a 100 to 1,000 fold decline in cell numbers occurred when initial populations were higher than 10 CFU/ml. Sodium tripolyphosphate produced less inhibition after heat sterlization (15 min, 121 C) than after filtelr sterilization, whereas sodium hexametaphosphate (n=21) retained most of its antimicrobial activity after heat sterilization. Supplementation of broth with Mg was effective in overcoming inhibition by 0.5% sodium tripolyphosphate, and an addition of 0.25 to 1.0 mM cation restored most of the growth. Inhibition was partially eliminated by Ca and Fe , but not by Zn or Mn . AS

CEREALS

1930 Hahn (DE) and Hood (LF). Development of an equilibrium dialysis technique for quantifying starch-lipid complexes. **Cereal Chemistry** 64(2); 1987; 77-80

A sensitive equilibrium dialysis technique for evaluating starch-lipid complexes was developed. The use of ^{14}C-labeled lipid permitted accurate quantification using lipid concn. that were soluble in water. An evaluation of membrane materials differing in chemical composition showed conventional regenerated cellulose dialysis film to be most effective in retaining dispersed starch while minimizing lipid adsorption to the membrane. A 12-h dialysis was necessary to attain equilibrium. The complex was soluble in water and complex formation was reversible. The amount of bound lipid was affected by starch concn. AS

1931 Vaag (P) and Munck (L). Immunochemical methods in cereal research and technology. **Cereal Chemistry** 64(2); 1987; 59-72

Various applications of immunochemical techniques in basic and applied studies of cereals, here exemplified by studies on barley malt, and beer are reviewed. After describing the production of antibodies and the immunochemical methods (precipitation-in-gel techniques, nephelometry, radioactive immunoassay, enzyme linked immunosorbent assay, immuneblot, immunoprecipitation), the paper reviews investigations where immunotechniques have been used to trace enzymes and other proteins from barley and malt during grain filling and germination and used to follow these proteins through the technological processes of brewing. Detection of proteins of nonbarley origin in barley and beer, i.e., contaminants, yeast proteins, and additives, is also discussed. AS

Barley

1932 Lehtonen (M) and Aikasalo (R). Pentosans in barley varieties. **Cereal Chemistry** 64(2); 1987; 133-134

The pentosan content of 68 two-rowed and 50 six-rowed barley var. was investigated. The var. were grown at three different farms located in southern, central, and northern Finland. The pentosan content in the two-rowed var. grown in southern Finland was between 6.7 and 9.8% of the dry matter, and in the six-rowed var. between 7.3 and 10,6%. The corresponding values grown in central Finland were 7.6-

9.7% in the two-rowed var. and 8.4-11.0% in the six-rowed ones. The pentosan content of the six-rowed var. grown in northern Finland was 9.2-10.2%. The pentosan contents observed in the six-rowed varieties were significantly higher than in the two-rowed ones. The differences among the average pentosan contents of the var. grown in the three locations were mainly the result of differences in varietal characteristics. AS

Rice

1933 Edwards (JV) and Lillehoj (EB). Isolation and liquid chromatographic determination of the cyclic peptide mycotoxin cyclosporin A from rice. **Journal of the Association of Official Analytical Chemists** 70(1); 1987; 126-129

1934 Normand (FL), Ory (RL) and Mod (RR). Binding of bile acids and trace minerals by soluble hemicelluloses of rice. **Food Technology** 41(2); 1987; 86-90, 99

1935 Sowbhagya (CM), Ramesh (BS) and Bhattacharya (KR). The relationship between cooked-rice texture and the physicochemical characteristics of rice. **Journal of Cereal Science** 5(3); 1987; 287-297

The Chopin-INRA Viscoelastograph proved to be a simple and effective tool for measuring the texture of cooked rice in a study with 60 samples of rice belonging to different quality types. The instrumental textural parameters (firmness and elastic recovery) were very highly negatively correlated with sensory attributes of cooked rice (tenderness, moistness and stickiness). The textural parameters were very highly correlated with total and water-insoluble amylose contents of milled rice, with the Brabender Viscogram 'relative breakdown' pattern, and, to a lesser extent, with gel consistency. Varietal differences in texture among high-amylose rices could be characterised very well by insoluble amylose-much better than by gel consistency. Gel consistency could perhaps be of greater value in differentiating low- and intermediate-amylose rices. AS

1936 Vandrasek (HT) and Warthesen (JJ). Thiamine partitioning and retention in cooked rice and pasta products. **Cereal Chemistry** 64(2); 1987; 116-120

Brown and enriched white rice were examined for thiamin leaching characteristics and stability under alkaline conditions during cooking. Rapid, initial thiamin leaching was followed by thiamin uptake as water was absorbed during cooking of white rice. Thiamin leached from brown rice throughout the cooking process. Thermal degradation was slower in brown than in white rice, but the extended cooking period required for tenderness in brown rice resulted in greater percentage of thiamin loss. Fourteen pasta samples, representing six pasta types, were examined for thiamin leaching and destruction during cooking. Thiamin loss during cooking of pasta products was evident only through leaching; thiamin retentions ranged from 47 to 66% in cooked pastas. Differences in thiamin retention among the pasta samples were related to the nature of the food matrix involved. AS

Triticale

1937 Pena (RJ) and Ballance (GM). Comparison of gluten quality in triticale: A fractionation reconstitution study. **Cereal Chemistry** 64(2); 1987; 128-132

The gluten quality of four agronomically acceptable secondary hexploid triticales, one hard red spring wheat ('Marquis'), and one soft wheat ('Fredrick') were examined. Whereas flour protein contents were similar, gluten protein contents and falling numbers values for the triticales were variable and lower than those for both wheats, especially Marquis. Mixing and baking studies of flours reconstituted on an equal gluten protein basis indicated that a considerable range of gluten quality existed among the triticales and between the hard and soft wheats. A linear relationship between peak time and peak area with gluten stretching values for the triticales was demonstrated. When flours were reconstituted with equal amounts of gluten protein from each of the triticales, the rheological properties of these flours were linearly related to the gluten strength of the parental gluten. Loaf volume increased for all the flours reconstituted at the higher gluten levels. On the basis of these analyses, 'Impala' triticale gluten appeared to be similar in quality to that found in 'Marquis' wheat. AS

Wheat

1938 Bell (BM), Daniels (DGH), Fearn (T) and Stewart (BA). Lipid compositions, baking qualities and other characteristics of wheat varieties grown in the U. K. **Journal of Cereal Science** 5(3); 1987; 277-286

The breadmaking performance of flours milled from U.K. grown wheat var. has been studied in relation to the composition of the 'free' lipids extractable by light petroleum (b.p. 60-80 C) from the wheats and to other attributes of the flours. The results with six var. grown at three sites in 1983 appeared to confirm reports of significant correlations between loaf volume and 'free' polar lipid contents in wheat samples from the U.S.A. and Canada. However, with 15 winter var. and six spring var. grown at three sites in 1984, no significant correlations were found between any lipid parameter and loaf volume or quality score of breads prepared by both the Chorleywood Bread Process and long fermentation methods. The best single indicator of breadmaking quality was the sodium dodecyl sulphate (SDS) sedimentation test. No useful equations for predicting breadmaking quality were found by multiple regression techniques using the various flour properties measured in this study. AS

1939 Dhaliwal (AS), Mares (DJ) and Marshall (DR). Effect of 1B-1R chromosome translocation on milling and quality characteristics of bread wheats. **Cereal Chemistry** 64(2); 1987; 72-76

Backcross derivatives of three commercial Australian bread wheat var. carrying the IB/IR translocation were compared with their recurrent parents for a range of milling and quality characteristics. The IB/IR translocation generally had no major deleterious effects on 1,000 grain wt., test wt., grain protein, flour protein, grain hardness, milling quality (flour yield and colour) or farinograph water absorption. In the hard wheats the IB/IR translocation did substantially and consistently reduce SDS-sedimentation volume and dough development time. There was also a tendency towards reduced extensigraph resistance and extensibility. However, for the latter characteristics the best IB/IR derivatives were similar to the recurrent parents. In sharp contrast in the soft wheat derivatives there was no evidence that the IB/IR translocation significantly reduced SDS-sedimentation volume, dough-development time, or extensigraph resistance. In this case, however, dough extensibility was consistently reduced in the IB/IR derivatives. The reasons for this contrast between the effects of the IB/IR on hard and soft wheats is unknown and deserves further study. AS

1940 Hoseney (RC). Wheat hardness. **Cereal Foods World** 32(4); 1987; 320-322

Aspects covered in this general type article include measurement of hardness, theories of grain hardness and importance of softness or hardness. KAR

1941 Mehta (P), Nagi (HPS) and Sekhon (KS). Effect of conditioning methods on physico-chemical, milling and functional (baking) properties of soaked wheat. **Journal of Food Science and Technology, India** 24(2); 1987; 55-60

Bread wheat of cv. WL-1562 and S-308 were soaked to 35% moisture at 30 C and after draining the water were dried in a forced air drier at 30 C to 13% moisture and conditioned in cold (30 C for 5 min) warm (45 Degree C, 90 min.), hot (88 Degree C for 12 min.) and in steam (103 C for 1/3 min.) with a resting period (at 30 C)of 24, 20, 16 and 8 h. Kernel wt., density, pearling index, water uptake, protein and ash contents of grains decreased with soaking. Soaking gave coarser flour, the proportion of which increased with hot and steam conditioning. Max. (76.4%) flour yield was obtained with warm conditioning; hot and steam conditioning gave higher yield but not significant. Ash content of flours reduced by soaking in both the var., soaking increased the whiteness of the flour. Conditioning method did not alter the ash content of flours. Diastatic activity and total sugars increased significantly with soaking whereas damaged starch and gluten considerably decreased. Steam conditioning of soaked wheat seriously injured the gluten properties and produced flour of low damaged starch. Bake absorptions of flour and whole meal were considerably reduced upon soaking; but loaf vol. improved. Warm or hot conditioning improved the loaf vol. and internal characteristics, but steam conditioned wheat, exhibited poor bread making properties. Cooking spread increased with soaking, but conditioning methods were of no use in improving its quality, Cake vol. and internal characters were better when soaked wheat was hot conditioned. The doughs from soaked wheat meal were sticky and baked to inferior quality chapathis. KAR

1942 Nadeau (DB) and Clydesdale (FM). Effect of sucrose, fructose and aspartame on fortificant iron solubility in a wheat flake cereal. **Journal of Food Protection** 50(1); 1987; 21-24

The iron solubilizing effect of three sweeteners (sucrose, fructose and aspartame) in a processed wheat flake cereal fortified with either ferric orthophosphate, hydrogen-reduced or electrolytically-reduced elemental iron was evaluated at various stages during a simulated **in vitro** gastrointestinal digestion. Added sweetener had little influence on soluble iron over controls, regardless of pH, iron or sweetener source, although effects may have been masked by various cereal components known to complex iron. AS

1943 Preston (KR), Kilborn (RH) and Dexter (JE). Effect of starch damage and water absorption on the alveograph properties of Canadian hard red spring wheats. **Canadian Institute of Food Science and Technology Journal** 20(2); 1987; 75-80

Samples of three Canadian var. of wheat were milled to low, normal and high damage levels and used to assess alveograph properties in relation to starch damage, dough water level and wheat var. Analysis of variance showed that the above factors had significant effects on alveograph pressure (P), length (L), P/L ratio, swelling index (G) and work (W). Increasing starch damage resulted in increased P, P/L and W values and decrease L and G values. Starch damage was also linearly related to P, L, W, P/L and G for each var. on mixing of low and high starch damaged flours. Variations in the slope response (steepness) of P; L and W values to starch damaged indicated that other varietal factors such as gluten strength also play an important role in determining alveograph properties. MVG

1944 San Buenaventura (ML), Domg (FM) and Rasco (BA). The total dietary fiber content of wheat, corn, barley, sorghum, and distillers' dried grains with solubles. **Cereal Chemistry** 64(2); 1987; 135-136

Efforts have been made to determine the total dietary fiber contents of distillers' dried grains with solubles made from three types of whole wheat, pastry flour, corn, barley and sorghum using the enzymatic, gravimetric method. MVG

Wheat bran

1945 Platt (SR) and Clydesdale (FM). Interactions of iron, alone and in combination with calcium , zinc, and copper, with a phytate-rich, fiber rich fraction of wheat bran under gastrointestinal pH conditions. **Cereal Chemistry** 64(2); 1987; 102-105

The effects of a gastrointestinal pH treatment on the mineral and phytic acid solubility of a phytate-rich, fiber-rich fraction of wheat bran in the presence of added Fe and other minerals were investigated. MVG

Wheat flour

1946 Oomah (BD) and Mathieu (JJ). Functional properties of commercially produced wheat flour solubles. **Canadian Institute of Food Science and Technology Journal** 20(2); 1987; 81-88

The physicochemical properties of wheat flour solubles (WFS) obtained by ultrafiltration and spray-drying of a gluten-wheat starch plant effluent were investigated. Adjustment of pH of the retentate (from 3.0 to 5.5) before spray drying resulted in reduction of globulin and acetic acid soluble protein fractions, lower emulsifying and foaming properties, and an increase in alkali soluble fraction. Wheat flour solubles exhibited a typical bell-shaped protein solubility curve with min. solubility at pH 6.0. Albumins comprised up to 50% of the total protein of WFS. No thermally induced rheological changes were exhibited by WFS, however, changes in starch pasting characteristics were observed when WFS were added at various levels to wheat starch. Treatment of the effluent with 250 p.p.m. of hydrogen peroxide reduced the extractability of polar lipids. AS

1947 Walther (C) and Grosch (W). Substrate specificity of the glutathione dehydrogenase (Dehydroascorbate reductase) from wheat flour. **Journal of Cereal Science** 5(3); 1987; 299-305

The substrate specificity of the glutathione dehydrogenase (dehydroascorbate reductase; EC 1.8.5.1) from wheat flour was determined at low substrate concn., which are of interest with respect to the improver action of dehydroascorbic acid (DHAA). L-Threo-DHAA was the best and D-threo-DHAA the worst substrate (20% activity relative to L-threo-DHAA) of the four DHAA stereoisomers. The activity of the enzyme towards both erythro-DHAA lies between the threo stereoisomers, but their ranking is dependent on the molar ratio of the erythro-DHAA to the glutathione. 1,2,3-Trioxocyclopentane was reduced at least as rapidly as the L-threo-DHAA. The enzyme was specific for glutathione as hydrogen donor; L-cysteinyl-L-glycine was not active as hydrogen donor. AS

Wheat proteins

1948 Fullington (JG), Miskelly (DM), Wrigley (CW) and Kasarda (DD). Quality-related endosperm proteins in sulphur-deficient and normal wheat grain. **Journal of Cereal Science** 5(3); 1987; 233-245

Specific groups of proteins associated with the baking properties of flour were identified by extracting flour from normal and deficient wheat with a sodium dodecylsulphate (SDS)-Tris buffer either with or without reducing agent. Total proteins (with reducing agent), extract proteins (without reducing agent), and residue proteins (re-extraction of sediment with reducing agent) were fractionated by SDS-polyacrylamide gel electrophoresis (with reducing agents present for all fractions). Significant correlations were obtained between the proportions of certain groups of polypeptides and flour-quality characteristics. The proportion of high mol. wt. (HMW) components (M_r 80,000; corresponding to HMW-glutenin subunits) in the residue was strongly positively correlated with resistance to extension and negatively correlated with dough extensibility and breakdown. Of the proteins extracted mainly by SDS without reduction, Omega-gliadins in the M_r range 51,000 to 80,000 showed the same correlations as the HMW-glutenin subunits, whereas proteins in the M_r range 38,000 to 50,000 and 28,000 to 39,000 were positively correlated with dough extensibility. The proteins of these latter ranges correspond mainly to Alpha-, Beta-, and Gamma-gliadins and LMW-glutenin subunits. The proteins of the lowest M_r range (M_r < 28,000), which corresponded to albumins (and some globulins) and appeared mainly in the unreduced extract, correlated negatively with resistance to extension and positively with dough breakdown and extensibility. Electrophoretic patterns of the residue proteins were similar to those obtained from residues in the SDS and Zeleny tests suggesting that the sedimentation-test residues provide a measure of the proportion of HMW-glutenin subunits present in the flour. AS

1949 Popineau (Y) and Pineau (F). Investigation of surface hydrophobicities of purified gliadins by hydrophobic interaction chromatography, reversed-phase high performance liquid chromatography and apolar ligand binding. **Journal of Cereal Science** 5(3); 1987; 215-231

The surface hydrophobicities of purified wheat Alpha-, Beta-, Gamma- and Omega gliadins were investigated by hydrophobic interaction chromatography (HIC) on Octyl- and Phenyl-Sepharose CL-4B, reversed-phase high performance liquid chromatography (RP-HPLC) on octadecylsilane (TSK ODS 120 T) and a polar ligand (2-p-toludinylnaphthalene-6-sulfonate, TNS) binding. Chromatographic methods, especially RP-HPLC, are rapid and easy to use, but they have some important limitations in that protein conformational structures during separation are unknown. Ligand binding is more time consuming but provides more fundamental information about protein hydrophobicity in solution and permits control of protein structure. Nevertheless, the results obtained using the three methods were in general agreement. On the basis of chromatographic experiments, a hydrophobicity scale for gliadins was established. These experiments also demonstrated a preference of glaidins for an aromatic ligand; this was particularly marked for Omega-gliadins, suggested that the surface hydrophobicities of Alpha-, Beta- and Gamma-gliadins depend on both aromatic and aliphatic amino acid side chains, whereas that of Gamma-gliadins depends mainly on aromatic side chains. The binding of TNS by gliadin molecules was co-operative and resulted in protein aggregation and masking of hydrophobic sites at high ligand/protein ratios. Gliadins differed in terms of the number of binding sites, with values ranging from 11 (Beta-gliadins) to 30 to 40 (Gamma-28): the binding constants also varied, being about ten times lower for Gamma-gliadins than for Alpha-, Beta- Gamma-gliadins. AS

1950 Tatham (AS), Field (JM), Smith (SJ) and Shewry (PR). The conformations of wheat gluten proteins. II. Aggregated gliadins and low molecular wt. subunits of glutenin. Journal of Cereal Science 5(3); 1987; 203-214

Fractions containing low-mol. wt. (LMW) subunits of glutenin and aggregated gliadins were prepared from four cv. of winter wheat that varied in their quality for breadmaking . The fractions were analysed by sodium dodecylsulphate polyacrylamide gel electrophoresis (SDS-PAGE) and their amino acid compositions determined. Their secondary structures were studied by circular dichroism (cd) spectroscopy and the proportions of Alpha-helix and Beta-sheet calculated from the spectra. These values were compared with the secondary structure content predicted from the published amino acid sequence of an aggregated gluten protein. When dissolved in 50% (v/v) aqueous propan-1-ol at 20 C the proportions of Alpha-helix varied from 34 to 37% and of Beta-sheet from 18 to 24%, compared with calculated values of 37% Alpha-helix and 15% Beta-sheet. Heating to 80 C resulted in greater decreases in the secondary structure contents of the reduced LMW subunits of glutenin than of the unreduced aggregated gliadins, indicating that the latter were partially stabilized by the intact disulphide bonds. There were no major differnces in the secondary structure contents or thermal stabilities of the fractions from the four cv. The cd spectra of both the aggregated gliadin and LMW subunit fractions were more similar to those of the Alpha-, Beta- and Gamma-gliadins than to those of the Omega-gliadins or high-mol.-wt. (HMW) subunits of glutenin, which is consistent with their known amino acid sequence relationships. AS

Wheat starch

1951 Doublier (JL). A rheological comparison of wheat, maize, faba bean and smooth pea starches. Journal of Cereal Science 5(3); 1987; 247-262

Two cereal (wheat and maize) and two legume (faba bean and smooth pea) starches were compared with respect to their rheological properties. Their pasting behaviours were estimated by means of two viscographic methods, the Brabender Viscograph and the Ottawa Starch Viscometer, and by their swelling-solubility patterns. Furthermore, the rheological properties of pastes were characterised-by studying their flow behaviour with a coaxial cylinders viscometer (Rheomat 30). When compared with cereal starches legume starches were characterised by solubilisation at lower temp. and more restricted swelling, but yielded pastes of comparable consistency. Thus, wheat and pea starch pastes had similar viscosities, whereas faba bean starch had a consistency intermediate between those of wheat and maize starch. However, as shown by the flow properties, a wide range of behaviour was observed, depending upon the pasting conditions. On the assumption that starch pastes are suspensions of swollen particles dispersed in a macromolecular medium, these data could be interpreted on the basis of the swelling-solubility behaviour. Differences between the Brabender Viscograph and the Ottawa Starch Viscometer could be ascribed to different pasting conditions, leading to quite different swelling and solubilisation. The flow properties could be interpreted in the same way and it was shown that the quite similar flow behaviour shown by legume and cereal starches under certain conditions did not correspond to the same suspension structure. Hence starch functionality, which must be related to paste viscosity and retrogradation as well, as cannot be estimated only on the basis of viscographic patterns and swelling-solubility profiles. AS

1952 Morrison (WR) and Gadan (H). The amylose and lipid contents of starch granules in developing wheat endosperm. **Journal of Cereal Science** 5(3); 1987; 263-275

Starch was isolated from three var. of wheat at various stages of grain development (endosperm filling) and separated by sedimentation into eight fractions according to granule size. Starch granule dimensions were measured using a Coulter, Counter with 100-Channel analyser, and whole wheat and starch granule compositions were determined. At most stages of development the numbers of A-granules/endosperm remained constant while granule size increased, but the numbers of B-granules/endosperm increased throughout grain development. The amylose content (% dry wt.) increased with granule size and with granule maturity, whereas lysophospholipid content (dry wt. basis) generally decreased with granule size but increased with granule maturity. Starch deposited on individual large A-granules at successive stages of development contained higher proportions of amylose and lysophospholipids than initial deposits. Similarly, small B-granule starch synthesised at successive stages of grain development contained more amylose and lysophospholipids than the earlier B-granule starch. It was calculated that there should be gradients of amylose and lysophospholipid composition along the outer radii of A-granules, and similar changes in successive populations of B-granules. It is concluded that there was a close relationship between amylose content and lysophospholipid content in the developing A-granules and in the developing B-granules in the starch of each wheat variety, but that this relationship was always different for the A- and B-granules. AS

1953 Zeleznak (KJ) and Hoseney (RC). The glass transition in starch. **Cereal Chemistry** 64(2); 1987; 121-124

An investigation of the glass transition temp. (T_g) of wheat starch revealed that T_g was extremely sensitive to the percentage of moisture present. It was possible to detect the T_g by differential scanning calorimetry only within a narrow moisture range (13-22%). The glass transition occurred below room temp. at moisture contents greater than 22%, and the transition was broad and ill-defined below 13% moisture. This may indicate that inter-and intra chain hydrogen-bonding is facilitated as water is lost from amorphous regions of starch. A comparison of granular and pregelatinized starches showed that a higher degree of crystallinity elevated T_g and enhanced the system's sensitivity to moisture. These findings are consistent with reports for synthetic semicrystalline polymers and contradict the suggestion that T_g immediately precedes melting in starch. AS

MILLETS

Corn

1954 Han (DE) and Hood (LF). Factors influencing corn starch-lipid complexing. **Cereal Chemistry** 64(2); 1987; 81-85

Lipid complexing by starch in aqueous dispersions was measured using equilibrium dialysis. An increase in saturated fatty acid or monoglyceride chain length resulted in higher binding values. Analysis of the cis unsaturated C-18 series of fatty acids showed that binding decreased as the number of double bonds increased. Lipid complexing decreased as temp. increased from 20 to 60 C. Lauric acid was the exception, showing no change varying the pH from 3.0 to 7.0 had no effect on binding values for any monoglyceride, C-18 cis unsaturated fatty acid, lauric or myristic acid. Higher levels of palmitic and stearic acid were bound as pH was increased from 3 to 7. Myristic acid and monomyristin incubated at pH 3 and 5 (40 C) showed no change in binding over the buffer molarity range of 0.2-0.8 M. In contrast, binding increased for these lipids with an increase in buffer molarity at pH 7. Waxy maize and hydroxypropyl corn starch bound less lipid than unmodified corn starch. AS

1955 Rati (ER), Prema (V) and Shantha (T). Modification of Pons's method of estimating aflatoxin B1 in corn, groundnut and groundnut cake. **Journal of Food Science and Technology, India** 24(2); 1987; 90-91

Pon's method for determination of aflatoxin B1 has been modified by eliminating column clean up and by introducing an additional TLC development in ether + hexane (1:1). Aqueous acetone extract is diluted to contain 25% acetone which expedites filtration and improves the clarity of the filtrate. Recovery of aflatoxin added to groundnut flake, groundnut cake and corn was 83-107%. Quantification of aflatoxin B1 in naturally contaminated commercial groundnut cake by the modified method compared well with that by Contaminants Branch method. AS

1956 Tyagi (VVS), Henke (RR) and Farkas (WR). Activation of an NADPH oxidase from maize by dipicolinic acid. **Phytochemistry** 26(4); 1987; 913-915

An NADPH oxidase has been partially purified from maize kernels. The activity of this enzyme, as means of by NADPH disappearance or oxygen consumption, was enhanced by dipicolinic acid (pyridine 2,6-dicarboxylic acid). Dipicolinic acid was not consumed in this reaction indicating that it was an activator rather than a substrate of this enzyme. AS

Corn starch

1957 Navickis (LL) and Bagley (EB). A comparison between corn starch and dry milled corn products in their dispersion properties. **Starch/Starke** 38(7); 1986; 217-220

Finger millets

1958 Malleshi (NG), Desikachar (HSR) and Tharanathan (RN). Physico-chemical properties of native and malted finger millet, pearl millet and foxtail millet starches. **Starch/Starke** 38(6); 1986; 202-205

The physico-chemical properties of starches isolated from native and malted finger millet, pearl millet and foxtail millet were studied. Malt starches, as compared with native starches, contained a majority of smaller granules, slightly more amylose, and exhibited higher gelatinisation temp., lower swelling power, higher solubility in water as well as in dimethyl sulphoxide and lower intrinsic viscosity. The **in vitro** digestibility of starches from native and malted millets was more or less similar but it was different for different starches; pearl millet starch was more susceptible whereas finger millet starch was slightly resistant for amylolysis. AS

PULSES

1959 Hoover (R) and Sosulski (F). Effect of cross-linking on functional properties of legume starches. **Starch/Starke** 38(5); 1986; 149-155

Refined starches from lentil, fababean and field pea contained 38.5, 32.0 and 34.2% amylose, respectively, where the water binding capacities, swelling powers, susceptibilities to amylase digestibility and amylograph viscosities were in the order: lentil > fababean > field pea. This evidence and the X-ray diffraction data suggested that the degrees of mole. association between starch chains, especially amylopectin, followed the order: field pea > fababean > lentil. Cross linking with phosphorus oxychloride decreased water binding capacity, swelling power, Alpha-amylase digestibility and 95 C viscosity in the amylograph but increased the degree of set-back. X-ray diffraction patterns indicated that cross linking occurred mainly in the amorphous regions of the starch granule. Scanning electron microscopy showed that cross linking hindered amylose exudation. The stable hot paste viscosities of cross-linked starches would be of value where low pH and high temp. are employed during pressure cooking or sterilization while the low degree of set-back of field pea starch should improve the freeze-thaw stability and textural quality of frozen foods. AS

1960 Musakhanian (J) and Ali (I). Fractionation by gel exclusion HPLC of proteins from acidic and alkaline extractions of **Phaseolus** beans. **Food Chemistry** 23(3); 1987; 223-234

The NaOH and the citric acid extracts of the beans (**Phaseolus vulgaris**) and(**Phaseolus lunatus**) contained 8-10 fractions. The proteins isolated from the extracts of the **P. vulgaris** beans were comprised predominantly of a relatively large mol. wt. fraction, regardless of the microstructure of the protein precipitate; several of the fractions which were relatively major components of the extracts were not found in the precipitates obtained from the extracts. KAR

Cowpeas

1961 Biswas (TK). Characterization of Beta-galactosidases from the germinating seeds of **Vigna sinensis**. **Phytochemistry** 26(2); 1987; 359-364

Four forms of Beta-galactosidase from the germinating seeds of **Vigna sinensis** were separated and partially purified by ammonium sulphate precipitation, ion exchange chromatography (DE-52) and gel filtration to more than 50% purity as judged by PAGE. The pH and temp. optima, stability, M_{rs} kinetic parameters and energy of activation of each enzyme have been determined. The four forms differed in their M_{rs} and ionic charges. AS

1962 Ehiwe (AOF) and Reichert (RD). Variability in dehulling quality of cowpea, pigeon pea, and mung bean cultivars determined with the tangential abrasive dehulling device. **Cereal Chemistry** 64(2); 1987; 86-90

The Tangent Abrasive Dehulling Device was used to investigate the dehulling quality of 11 cowpea (**Vigna unguiculata** L Walp.). 23 pigeon pea (**Cajanus cajan** L. Mill sp.), and 24 mung bean (**Vigna radiata** L Wilczek) cv. Differences($P < 0.05$) in dehulling quality of cv. within each sp. were observed. The yield (47.8-90.2%) and dehulling time (0.08-6.18 min) of cowpea varied widely suggesting that it may be desirable to monitor these characteristics in a cowpea breeding program. Some cv. of cowpea, including 1836-013J; 2724-01F, and 3871-02F exhibited very good dehulling quality (high yield and short dehulling time). The yield (79.0-83.8%) and dehulling time (0.48-1.78 min) of pigeon pea did not vary as widely as cowpea, and most cv. exhibited good dehulling quality. The dehulling quality of the mung bean cv. was generally poor because of low yields (58.2-73.8%) and long dehulling times (2.00-3.50 min). The major seed factors responsible for good dehulling quality of these legumes included resistance to seed splitting during dehulling and a seed coat loosely bound to the cotyledon. AS

Faba beans

1963 Jongen (WMF), Boekel (MAJSVan) and Broekhoven (LWVan). Inhibitory effect of cheese and some food constitutents on mutagenicity generated in **Vicia faba** after treatment with nitrite. **Food and Chemical Toxicology** 25(2); 1987; 141-145

The inhibitory potential of various food constituents on the mutagenicity generated in faba beans after treatment with nitrite has been investigated. Cheese was able to inhibit this direct-acting mutagenicity. The antimutagenic factor was not extractable from cheese; solvents of different polarity were used for the extraction. Casein, pectin, gelatin, **Vicia faba** protein and, to a lesser extent, whey protein and starch could also inhibit mutagenicity. A decrease in mutagenicity was always accompained by a decrease in total N-nitroso content, as measured analytically. The mutagenic principles appeared to bind more strongly onto cheese than onto **V. faba**. The implications of this finding are discussed. AS

Lentils

1964 Purificacion Corchete (M) and Guerra (H). Alpha- and Beta-galactosidase activities in protein bodies and cell walls of lentil seed cotyledons. **Phytochemistry** 26(4); 1987; 927-932

Cotyledons of mature **Lens culinaris** seeds contain two forms of both Alpha- and Beta-galactosidase which can be separated by ion exchange chromatography. These forms are present in cotyledon cell walls and protein bodies except Beta-galactosidase II, which is undetectable in the cell walls of these organs. All the enzymatic forms were active in an acid pH range but each behaved differently with different substrates, both natural and synthetic, and in the action of different effectors on the activity, Alpha-galactosidase I and II were able to release free sugars from several putative substrate oligosaccharides and all the forms of Alpha- and Beta-galactosidase were seen to release galactose from lentil storage glycoproteins. AS

1965 Revilla (MA) and Tarrago (JF). Scanning electron microscopy study on starch granules in lentil cotyledons. Starch/Starke 38(6); 1989; 199-202

Scanning electron microscopy was used to analyze the surface changes taking place in the starch granules of lentil cotyledons during germination. In the initial germination phases, the granules exhibited a smooth surface and their interior was compact. As time progressed, the deposition of membrane-like material onto surface of the granules was seen to increase, and at 10 days their interior could be described as compartmentalized. After this it was possible to observe starch fragments with polyhedral shapes; these are thought to have originated in the interior of the granules and to have dispersed throughout the cell during their endogenous degradation. AS

Peas

1966 Koyoro (H) and Powers (JR). Functional properties of pea globulin fractions. **Cereal Chemistry** 64(2); 1987; 97-101

Protein was extracted from green pea flour using neutral buffer containing 0.5M NaCl. Globulins were precipitated by a combination of dilution and adjustment to pH 4.5 and further fractionated into legumin and vicilin-rich fractions by differential solubility at pH 4.8. Both vicilin and legumin preparations were 80% soluble at pH 3, but the vicilin preparation was markedly more soluble than legumin at pH 7(96 vs. 73%). The vicilin preparation produced more stable foams and emulsions, whereas the legumin gave greater foam expansion and emulsion capacities. Surface hydrophobicity and foaming capacity of both preparations were markedly increased by heating neutral solutions 5 min at 90 degree C. AS

1967 Lasztity (R), El Morsi (EA), Abd-El Same (MB), El Sayed (AH) and Ismaeil (HA). Fractionation and characterization of **Pisum sativum** albumins. **Acta Alimentaria** 15(2); 1986; 101-110

Study of the effect of pH on the solubility of the albumins extracted from Lincoln seeds showed that the min. solubility of albumins was at pH 4.1. The total pea albumins were fractionated into at least six components by ion exchange chromatography on DEAE-cellulose column as well as gel filtration chromatography on Sephacryl S-200 column. The spectrophotometric analyses for the albumin components separated by gel filtration indicated the contamination of components A and D with nucleic acids. No protein was detected in peak E when subjected to polyacrylamide gel electrophoresis or by reaction with Folin reagents. Examination of total albumins by polyacrylamide gel electrophoresis revealed two major and more minor bands after staining with Amido Black. The amino acids analyses showed that the total albumins and their components contained relatively high levels of glutamic and aspartic acid as well as leucine+isoleucine. Substantial amounts of lysine and arginine were also recorded in the albumins. The level of cystine was low. AS

Phaseolus vulgaris

1968 Hincks (MJ) and Stanley (DW). Lignification: Evidence for a role in hard-to-cook beans. **Journal of Food Biochemistry** 11(1); 1987; 41-58

An investigation was undertaken to establish whether lignification was a possible mechanism contributing to the hard-to-cook defect in beans (**Phaseolus vulgaris**). Cell wall material (CWM) from control and defective beans was isolated and microscopic techniques employed to compare the two fractions. Transmission electron microscopy indicated that potassium permanganate-fixed material had heavier deposition of manganese dioxide in cell corners, secondary walls and middle lamella of hard beans, pattern seen during the lignification of plant tissue. CWM from hard beans had a lamellated appearance not seen in the control as viewed by scanning electron microscopy. It is suggested that this is a result of cellulose deposition, a process known to occur before lignification. This tentative evidence of lignin within the cell walls of legume seeds has a host of implications for hydration during cooking, cell separation and ultimately, texture. AS

Winged beans

1969 Gordon (MH) and Mtebe (K). Properties of winged bean lipoxygenase (**Psophocarpus tetragonolobus**). **Food Chemistry** 24(3); 1987; 219-226

Optimal activity of lipoxygenase was found at pH 9 and a linoleic acid concn. of approx. 1.7 x 10^{-3} M. The crude extract was relatively stable at 50 C but lost half its activity within 5 min. at 60 C and 1 min. at 65 degree C. Lipoxygenase activity was completely eliminated by boiling the seeds in water for 10 min., but inactivation was considerably slower during dry heating. Peroxidase was shown to be significantly more stable to heat treatment than lipoxygenase. KAR

OILSEEDS AND NUTS

Groundnuts

1970 Sheikh (IA), Aslam (M) and Arshad (M). Preparation and nutritional evaluation of groundnut protein isolate from industrially produced groundnut cake. **Pakistan Journal of Science** 35(12); 1983; 31-35

Jojoba

1971 Wiseman (MO) and Price (RL). Characterization of protein concentrates of jojoba (**Simmondsia chinensis**) meal. **Cereal Chemistry** 64(2); 1987; 91-93

Protein was extracted from mechanically pressed and hexane-extracted jojoba (**Simmondsia chinensis**) seed meal, using four different procedures. These methods involved extracting protein with water, extracting protein with 0.15 M NaCl, washing the meal with methanol/acetone(3:1) before extracting protein with water, or then rewashing this concn. with methanol/1N HCl (98:2). The soluble protein content of the defatted meal was 20%. The above procedures recovered 18-65% of the total protein in the meal. Trypsin inhibitor activity and phytic acid concn. were reduced to acceptable levels. Concn. of Simmondsin and polyphenolics were also significantly reduced. AS

1972 Wiseman (MO) and Price (RL). Functional properties of protein concentrates from pressed jojoba meal. **Cereal Chemistry** 64(2); 1987; 94-97

Seeds from **Simmondsia chinensis** were commercially pressed and defatted with hexane. Protein conc. were prepared from the oil-free meal by four methods: extracting protein with water; extracting protein with 0.15 M NaCl; after washing the meal with methanol/acetone (3:1) extracting protein with water (SDI); rewashing SDI with a solution of methanol and 1N HCl (98:2)(SDI). These conc. were evaluated for their functional properties of protein solubility gelation, water absorption, oil absorption, and foaming. The protein conc. were more soluble at alkaline pH than at neutral or acidic pH. Gelation required despersions with at least 6% protein at neutral pH and at least 20% protein at alkaline pH. Capacities for absorbing oil and water were similar to those of soy protein conc. The most stable foams were formed at pH 4. The foaming properties of SDI conc. were further tested at 4, 37, 55, 80 and 110 C; and in the presence of sucrose, potassium acid tartarate, salt, and both sucrose and potassium acid tartrate. The foam capacity of protein dispersions held for 30 min increased as incubation temp. increased to 110 C. The additives did not affect the expansion capacity or stability of the foams. The capacity and stability of foams from jojoba protein conc. were similar to those of egg albumin. AS

Rapeseeds

1973 Saini (HS) and Wratten (N). Quantitative determination of total glucosinolates in rapeseed and meal digests. **Journal of the Association of Official Analytical Chemists** 70(1); 1987; 141-145

Soybeans

1974 Mostafa (MM), Rahma (EH) and Raddy (AH). Chemical and nutritional changes in soybean during germination. **Food Chemistry** 23(4); 1987; 257-275

Germination of soybeans for 6 days depressed the trypsin inhibitor activity by 32%. Oil content, acid value, iodine value, and total unsaturated fatty acids of soybean oil decreased while peroxide value, and total saturated fatty acids pronouncedly increased. Different periods of soybean germination increased non-protein N and decreased reducing sugars. However total ash content decreased due to soaking; there after it was constant for the rest of the germination period. KAR

Soy milk

1975 Lal (RR), Siripurapu (SCB) and Singh (BPN). Physical properties of unsweetened and sweetened soy milk. **Journal of Food Science and Technology, India** 24(2); 1987; 60-63

Effect of temp. (0-100 C) on density, viscosity, sp. heat and thermal conductivity of sweetened (6% sugar) soy milk (SSM) was compared with unsweetened (USSM) (1.5% sugar) soy milk having equal levels of solids content. The density of USSM varied from 1.03459 g/ml at 10 C to 1.00365 g/ml at 90 C and the corresponding values for that of SSM was 1.0369 to 1.0061 g/ml. An empirical equation has been derived to correlate the density of soy milk at any temp. to its density at 20 C. The viscosity decreased from 8.62 cp at 10 C to 1.04 cp at 90 C and from 7.52 cp at 10 C to 0.86 cp at 90 C for SSM and USSM resp. An equation has been derived to connect the relationship between viscosity and temp. of soy milk. The sp. heat ranged from 0.9525 at 20.0 C to 0.9623 cal/(g C) at 92.9 C for USSM and from 0.9145 at 20.1 C to 0.9234 at 92.7 C for SSM. The relationship has been expressed through an equation which can predict the sp. heat value of soy milk at any temp. in the range of 20-90 C. The range of thermal conductivity of USSM was 0.33271 at 37.68 C to 0.41341 kcal/(h m C) at 92-49 C and that of SSM was 0.31152 at 38.30 C to 0.40385 kcal (h m C) at 89.79 C. KAR

Soy proteins

1976 Pilosof (AMR), Lopez de Ogara (MC) and Bartholomai (GB). Effect of slurry preparation methods on the rheological and gelling behaviour of soy protein. **Journal of Texture Studies** 17(4); 1987; 347-355

The order of addition of solutes and soy protein during the preparation of slurries influenced rheological behaviour of unheated and heated slurries. The effect of the order of addition of glucose, sucrose and sodium phosphate, into the slurries was small with respect to the influence of the order of addition of calcium chloride and sodium chloride. The effectiveness of salts in reducing apparent viscosity of both unheated and heated slurries was greater than that of

WLL spent hen. No significant difference was observed in deboned meat yield between WLL and WLH. WLH yield significantly higher fat content than the other types. Dressing % was higher in RIR than in WLH or WLL. The increased meat yield in RIR was due to the increased leg meat yield. The deboned meat and total edible meat could be predicted from either live or dressed wt. which are highly correlated in both the breeds. Deboned meat from RIR showed significantly higher water holding capacity, emulsifying capacity and lower collagen c tent than WLH or WLL, thereby showing its suitability for preparing emulsion type sausage products. KAR

Turkeys

2055 Poste (LM), Moran (ETJr), Butler (G) and Agar (V). Subjective and objective evaluation of meat from Turkeys differing in basting and final internal cooking temperature. **Canadian Institute of Food Science and Technology Journal** 20(2); 1987; 89-93

Effect of commercial basting and final intestinal breast temp. on the cooked turkey yield, fat and moisture content, and cooking and sensory characteristics was studied. Result showed that final internal temp. appeared to act independently on the sensory and other parameters measured. An exception was in appearance where both clearly act together in the 95 C, basted turkey to give an overdone appearance. It also appeared that basted turkeys, even though over cooked had comparable or better eating quality than optimally cooked basted turkey, with the exception of appearnce. This suggested that basting might be compensating for'over cooking' to some extent. MVG

SEAFOODS

2056 Villeneuve (JP), Fowler (SW) and Anderlini (VC). Organochlorine levels in edible marine organisms from Kuwaiti coastal waters. **Bulletin of Environmental Contamination and Toxicology** 38(2); 1987; 266-270

Cod

2057 Nguyen (CD) and Haard (NF). Evaluation of methods for determination of moisture content of heavy salted cod, **Gadus morhua**. **Canadian Institute of Food Science and Technology Journal** 20(2); 1987; 65-69

The study was undertaken to determine the feasibility of using the water sorption characteristics of heavy salt cod, using a water activity sensor, as a non-destructions means of estimating the water content of the product. Additionally, a Compu-Trac analyser to analyse the moisture content of heavy salt cod was also used. MVG

2058 Wang (MY) and Orgrydziak (DM). Residual effect of storage in an elevated carbon dioxide atmosphere on the microbial flora of rock cod (**Sebastes** spp.) **Applied and Environmental Microbiology** 52(4); 1986; 727-732

A residual inhibitory effect on microbial growth due to modified-atmosphere (MA) storage (MA, 80% carbon dioxide, 20% air) was demonstrated for rock cod fillets stored in MA and transferred to air at 4 C. Results of measurements of carbon dioxide conc. of the fillets suggested that the residual effect after transfer from MA to air was not due to retention of carbon dioxide at the surface of the fillets but was probably due to the microbial ecology of the system. **Lactobacillus** spp. and tan **Alteromonas** spp. (TAN) predominated after

7 and 14 days of storage in MA. During storage in MA, **Pseudomonas** spp. were inhibited or killed. Following transfer from MA to air, the percentage of the total flora represented by **Lactobacillus** spp. and TAN bacteria decreased, and 6 days after transfer **Pseudomonas** spp. were again dominant. AS

Fish

2059 Habig (C), Nomeir (A), Digiulio (RT) and Abou-Donia (MB). Extraction and determination by gas chromatography of S, S, S-Tri-n-Butyl phosphorotrithioate (DEF) in fish and water. **Journal of the Association of Official Analytical Chemists** 70(1); 1987; 103-106

Rapid, simple, sensitive methods are suggested for determining DEF in fish and water. They are particularly useful when either small samples and /or many samples need to be analysed. MVG

2060 Hight (SC) and Corcoran (MT). Rapid determination of methyl mercury in fish and shellfish: Method development. **Journal of the Association of Official Analytical Chemists** 70(1); 1987; 24-30

A modified electron capture and gas chromatographic (EC-GC)method for rapid detn. of methyl mercury in fish and shellfish is described. Results obtained by the method are equivalent to those for the AOAC official first action methods for methyl mercury and Hg. MVG

2061 Jacini (G). Furanoid fatty acids and lipids. **Fette Seifen Anstrichmittel** 88(8); 1986; 290-292

The furanoid fatty acids and furanoid lipids are reviewed, present in nature, in testes and liver of many fishes, or produced through autoxidation or photo-oxidation of linoleic acid linolenic acids. Some recent working hypotheses are examined and analyzed about the bio-synthesis of furanoid fatty acids in fishes. AS

2062 Moody (GJ), Sanghera (GS) and Thomas (JDR). Chemically immobilised bi-enzyme electrodes in the redox mediated mode for the flow injection analysis of glucose and hypoxanthine. **Analyst** 112(1); 1987; 65-70

Flow injection analysis systems incorporating amperometric bi-enzyme electrodes for glucose and hypoxanthine detn. are described. The sensors were based on glucose oxidase-peroxidase for the detn. of glucose and xanthine oxidase-peroxidase for the detn. of xanthine and hypoxanthine and the enzymes were immobilised on nylon mesh and held over a platinum electrode. The hydrogen peroxide product of the enzymatic catalysis was monitored amperometrically in a three - electrode Stelte cell, adapted for flow injection analysis, after its peroxidase-catalysed reaction with hexacyanoferrate (II). The use of the hexacyanoferrate(II)mediator permitted a low applied potential (-100 mV vs. Ag-AgCl) to be used, enabling the detn. of glucose in blood serum samples without difficult sample pre-treatment. The xanthine oxidase-peroxidase bi-enzyme electrode was used to determine hypoxanthine in fish meat as an indicator of deterioration during storage and the results compared favourably with an alternative spectrophotometric approach recommended by the Analytical Methods Committee (AMC) according to the equation [hypoxanthine]Electrode = 1.01[hypoxanthine]AMC 4.0×10^{-3} with a correlation coeff. of 0.998. AS

Cod

2063 Simpson (MV) and Haard (NF). Temperature acclimation of Atlantic cod (Gadus morhua) and its influence on freezing point and biochemical

Food Biochemistry 11(1); 1987; 59-68

The carotenoid pigments of the yellow and orange flesh var. of the pumpkins **Cucurbita moschata** and **C. maxima** were identified and quantified, Alpha-carotene, Beta-carotene, Zeta-carotene, Beta-carotene 5,6-epoxide, Beta-cryptoxanthin, lutein, taraxanthin, zeaxanthin, luteoxanthin and auroxanthin were detected in the pumpkins. The difference was that the yellow variety of **C. moschata** had no zeaxanthin. The quantitative patterns of the two var. were similar. Although some quantitative variation was observed, lutein, Beta-carotene and luteoxanthin predominated. The difference in the colour between the two var. resulted from these quantitative differences in carotenoid composition. The vitamin A activity of the **C. moschata** var. with yellow flesh was higher than that of the **C. maxima**, which had many oxygenated carotenoids. AS

Tomatoes

1985 Mislivec (PB), Bruce (VR), Stack (ME) and Bandler (R). Molds and tenuazonic acid in fresh tomatoes used for catsup production. **Journal of Food Protection** 50(1); 1987; 38-41

1986 Zamora (R), Olias (JM) and Mesias (JL). Purification and characterization of tomato lipoxygenase. **Phytochemistry** 26(2); 1987; 345-347

Lipoxygenase was partially purified (26-fold) from tomato (**Lycopersicon esculentum**) fruits by ammonium sulphate precipitation and hydrophobic chromatography, and further characterized by disc gel electrophoresis, chromatofocussing and M_r detn. The enzyme had a pH optimum of 6.8, and K_m values for linoleic acid and linolenic acid of 1.42 and 2.60 mM_r respectively. The pI was 6.3 and electrophoresis at pH 8.0 revealed a major lipoxygenase band at R_f 0.14. M r_f detn. gave a value of 97 plus or minus 2K. Incubation of linoleic acid with partially purified enzyme gave a mixture of linoleic hydroperoxides in which the ratio of the 9- to the 13-hydroperoxide isomer was 24:1. The major product was characterized as 9-hydroperoxyoctadeca-**trans-10-cis-12**-dienoic acid. AS

Tomato sauces

1987 Bandler (R), Brickey (PM), Cichowicz (SM), Gecan (JS) and Mislivec (PB). Effects of processing equipment on Howard mold and rot fragment counts of tomato catsup. **Journal of Food Protection** 50(1); 1987; 28-37

FRUITS

Apples

1988 Bourne (MC). Effect of water activity on texture profile parameters of apple flesh. **Journal of Texture Studies** 17(3); 1986; 331-340

Fresh apple with a water activity of approx. 0.99 was partially dehydrated, then equilibrated to nine water activity levels down to water activity 0.01. The water desorption isotherm for apple is given. Instrumental texture profile analysis was performed at each water activity level. As the water activity decreased hardness increased slowly, then rapidly at water activity 0.12 then decreased again at water activity 0.01; deformation first increased sharply then steadily decreased; springiness increased to water activity 0.33 then decreased; cochesiveness increased down to water activity 0.65, held steaded to water activity 0.33 then decreased; gumminess and chewiness increased down to water activity 0.12 then decreased. Fracturability was present only at the extremes (water activity 0.99 and 0.01)and was also absent at all other water activity levels. Complex changes in textural properties occur as apple is dehydrated and most of these changes occur most rapidly near the BET monolayer level of water activity. AS

Bananas

1989 Jayaraman (KS) and Ramanuja (MN). Changes in polyphenoloxidase and other endogenous factors during ripening in some banana varieties. **Journal of Food Science and Technology, India** 24(2); 1987; 67-71

Changes in the polyphenoloxidase (PPO) activity and level of polyphenol content, ascorbic acid and pH were studied during different stages of ripening (raw, half ripe, ripe, fully ripe and over ripe) in the pulp tissue of 3 banana cv. ((i) Dwarf cavendish (**M. cavandishii**), (ii) Pooja bale (**M. paradisiaca**) and (iii) Rasabale (**M. sapidisiaca**)). Varietal variation in the content of chemical constituents during ripening was noticed. However, a combination of factors involving PPO activity and level, ascorbic acid content and pH influenced the browning potential at any particular stage of maturation and the total polyphenol content which either remained at constant level as in (i) or decreased during ripening as in (ii) and (iii) did not influence the browning. PPO activity and concn. in the pulp increased during ripening by 100% in (i), 58% in (ii) and 55% in (iii). Buffer soluble proteins showed a steady increase from raw to over ripe stage. Gel electrophoresis of the partially purified PPO and buffer soluble proteins during ripening revealed varietal differences in changes in PPO isoenzyme and protein patterns. It is concluded that synthesis of new PPO isoenzymes and proteins and active changes in their pattern takes place in the preclimacteric and climacteric tissues while the postclimacteric tissues were generally characterised by their breakdown. KAR

1990 Jayaraman (KS), Ramanuja (MN) and Vijayaraghavan (PK). Studies on the purification of banana polyphenoloxidase. **Food Chemistry** 24(3); 1987; 203-217

Studies on the extractability of polyphenoloxidase (PPO) from the pulp of five banana cv revealed a varietal difference in the nature of binding of the PPO in the cell, with the enzyme being entirely in the soluble fraction in one and partly associated with the cell wall in others, necessitating use of a detergent to release it from the latter. Partial purification by acetone precipitation and chromatography using a DEAE-cellulose column yielded two major fractions DE-I and DE-II with purifications of 4- and 16.3-fold and activity recoveries of 38.2 and 43.3% respectively. Further gel filtration of the two fractions on a Sephdex G-100 column improved the purifications to 44- and 50-fold respectively with full activity recovery. Polyacrylamide gel electrophoretic studies showed the two fractions to be composed of isoenzymes differing in pattern. The purified enzyme showed max. absorption at 275 nm. AS

Mangoes

1991 Prabha (TN) and Patwardhan (MV). Endogenously oxidizable polyphenols of mango, sapota and banana. **Acta Alimentaria** 15(2); 1986; 123-128

The endogenous substrates for oxidation were ellagic acid in mango peel, none in mango pulp, traces of chlorogenic acid and catechin in sapota tissues and dopamine in banana peel and pulp. The number of oxidizable substrates as well as their extent of browning was very poor in the peel and pulp of all the three tissues. The poor browning is attributed to lack of polyphenoloxidase (PPO) in mango pulp, presence of mostly nonoxidizable phenolics in mango peel and banana and presence of endogenous inhibitors of PPO in sapota tissues. Sapota tissue in the unripe stage contained some PPO inhibitors of non-dialyzable protein type, which disappeared on ripening. AS

Pears

1992 Randhawa (JS), Dhillon (BS), Bal (JS) and Bhullar (JS). Studies on the pectin methylesterase activity during cold storage of 'Patharnakh' pear. **Journal of Food Science and Technology, India** 24(2); 1987; 71-73

Pear (Pyrus pyrifolia) fruits harvested at weekly intervals over a 22-day period from July 22 in 1980 and July 15 in 1981 were kept in cold storage (0-3.3 C and 85-90% RH) after treating with Cycocel (CCC) 2000 and 4000 p.p.m., gibberellic acid (GA) 100 and 200 p.p.m. calcium chloride 4 and 6% and wax emulsion 6 and 9% and the pectin methylesterase (PME) activity and the firmness of the fruit were assessed during 100 days storage period. Post-harvest treatment with CCC, GA, calcium chloride and 6% wax emulsion increased PME activity after 100 days of cold storage. Highest activity was observed with 200 p.p.m. GA followed by 4000 p.p.m. CCC and 6% calcium chloride treatments. PME activity increased with the delay in the date of harvesting during 1980 and also after 100 days of cold storage during both the years. Fruit firmness decreased with the delay in harvest and during cold storage with increased PME activity. Cold storage of fruits for 100 days decreased the fruit firmness. The optimum time for harvesting Patharnakh var. of pear for cold storage is the second fortnight of July. KAR

Raisins

1993 Ziemke (W). Raisins detre. **Food** 9(2); 1987; 41, 43, 45

Describes the mould retarding properties of raisins. This article also covers raisin nutrition; recommended conditioning procedures; effect of leached soluble solids; use of crushed raisin; mould retarding properties in baked goods (raisin juice conc. can be used in breads, sweet dough, rolls, cookies; fruit cakes and crackers); and crushed wheat bread tests. BV

CONFECTIONERY, STARCH AND SUGAR

Confectionery

Chocolate

1994 Tscheuschner (H-D) and Markov (E). Instrumental texture studies on chocolate. III. Processing conditioned factors influencing the texture. **Journal of Texture Studies** 17(4); 1987; 377-399

The texture characteristics of chocolate are greatly influenced by processing conditions. By means of instrumental texture studies the effect of variations in the conching process parameters, of precrystallization and after-crystallization during storage is illustrated. In order to compare the results, the exact precrystallization of the chocolate masses before moulding is of special importance. AS

Starch

1995 Eliasson (A-C). Viscoelastic behaviour during the gelatinization of starch. I. Comparison of wheat, maize, potato and waxy-barley starches. Journal of Texture Studies 17(3); 1986; 253-265

Dynamic measurements were used to characterize the viscoelastic behaviour during gelatinization of wheat, maize, potato and waxy-barley starches. During the experimental conditions used the curves of storage modulus and loss modulus versus temp. showed an initial peak for all starches, followed by a second peak at 90-95 C in the case of wheat and maize starches. Wheat starch gave a more viscous response than the other starches. The changes in G′ and G" were correlated to the changes in gel volume and amylose leaching during the heating. The results were interpreted using a composite materials as a model for the starch gel. AS

1996 Elliasson (A-C). Viscoelastic behaviour during the gelatinization of starch. II. Effects of emulsifiers. Journal of Texture Studies 17(4); 1987; 357-375

The viscoelastic behaviour during the gelatinization of starch in the presence of emulsifiers was studied in oscillatory shear. Glycerol-monostearate and sodium stearoyl-lactylate delayed the viscoelastic changes during gelatinization in a way which was interpreted as related to the granules being stiffer in presence of these emulsifiers. Sodium dodecyl sulphate caused a destabilization of the granules, resulting in the rheological changes occurring at lower temp. Emulsifiers increased the viscous part of the rheological response. In a waxy-starch var., where the amount of amylose is small, emulsifiers had only a small effect on gelatinization. It was concluded that the formation of an amylose-lipid complex was of importance if an emulsifier was to exert an effect. AS

1997 Evans (ID). An investigation of starch/surfactant interactions using viscosimetry and differential scanning calorimetry. Starch/Starke 38(7); 1986; 227-235

1998 Holm (J), Bjorck (I), Drews (A) and Asp (NG). A rapid method for the analysis of starch. Starch/Starke 38(7); 1986; 224-226

A rapid enzymic method for starch analysis, especially in cereal products, is presented. One person can analyze 30 samples per day. The method includes a 15 min. gelatinization step in a boiling water bath in the presence of a thermostable Alpha-amylase, a 30 min. amyloglucosidase incubation of a subsample, and subsequent detn. of glucose with a glucose oxidase/peroxidase reagent. The method was evaluated by analysis of the starch content in various raw and industrially processed wheat samples. The method showed high precision (CV = 0.6-1.0%) and accuracy. Some factors which might affect the enzymic availability of starch and thus its recovery in the analysis are evaluated and discussed. AS

1999 Patel (AR), Patel (MR), Patel (NR), Patel (KC) and Patel (RD). Graft copolymers of starch and polyacrylonitrile. Effect of source. Starch/Starke 38(7); 1986; 235-237

2000 Zeevalkink (JA) and Jans (AJM). Anaerobic treatment of starch wastewater. Long-term experiments and prospects. Starch/Starke 38(7); 1986; 243-246

Shortly after its introduction, anaerobic treatment by the upflow anaerobic sludge blanket (UASB) process gained considerable popularity for the treatment of wastewaters, especially in the starch industry. The UASB concept is briefly introduced and possibilities and problems associated with its application are reviewed. Subsequently, an impression is given of the results achieved with installations that have operated for some years in starch plants in the Netherlands and in Ireland. These case studies show that the process performs excellently and remains stable even under highly fluctuating loading rates. Furthermore, recent experience with the commissioning of a treatment plant for a wheat starch factory in Ireland has shown that the process can be started up rapidly using active granular sludge from other treatment plants. AS

Sugars

2001 Esteves (AML), Ferreira (VF) and Paiva (LMC). A new process for obtaining inverted sugar using carbon dioxide. **Starch/Starke** 38(5); 1986; 173-175

Carbon dioxide gas can be used as an acid catalyst, to promote sucrose inversion, with an efficiency of 95-98%. The reaction yield was found to be a function of the gas pressure. A major advantage of the carbon dioxide gas catalyzed process is that the steps of neutralization and de-ionization are avoided. KMD

Syrups

2002 Slominska (L) and Starogardzka (G). Studies on the application of maltogenic amylase in the production of maltose containing syrup. **Starch/Starke** 38(6); 1986; 205-210

The thermostable and relatively acid stable maltogenic amylase produced by **Bacillus stearthermophilus** was investigated. (The investigations have been carried out with the aim of producing high maltose syrup from liquefied potato starch. The results of the investigations showed that the application of the maltogenic enzyme made possible to produce potato syrup containing 70-80% maltose from DE 12 enzyme liquefied starch in concn. of 30-35%. AS

BAKERY PRODUCTS

Bread

2003 Sels (JP), Flendrig (JA) and Postmes (ThJ). The influence of guar-gum bread on the regulation of diabetes mellitus type II in elderly patients. **British Journal of Nutrition** 57(2); 1987; 177-183

The effect of a high-fibre bread mixed with guar-gum (75g/kg flour) on serum glucose, connecting peptide (C-peptide), haemoglobin A1 (HbA1), high-density-lipoprotein-cholesterol(HDL-cholesterol) and triglycerides was examined in fourteen elderly patients with Diabetes mellitus type II. The mean daily consumption of guar gum was 8.1 g. Gastrointestinal disorders were not observed. Consumption of guar-gum bread resulted in a significant decrease in C-peptide values on the 1st day and blood glucose values after 3 wks (both measured 90 min after breakfast). C-peptide values remained low, while an unaccountable 'rebound' phenomenon was seen in the blood glucose values 90 min after breakfast at the end of the study. No significant change was seen in respect HDL -cholesterol and triglycerides. However, a small significant increase in HbA1 was noted. AS

Chapatis

2004 Haridas Rao (P), Leelavathi (K) and Shurpalekar (SR). Objective measurements of the consistency of chapati dough using a research water absorption meter. Journal of Texture Studies 17(4); 1987; 401-420

A Research Water Absorption Meter (RWAM) was adapted to measure the consistency of chapati doughs made from whole wheat flour (WWF). Doughs of optimum consistency were characterized by an extrusion time of 60 plus or minus 5 s when extruded with an additional wt. of 2 kg, after resting the dough for 20 min. The RWAM consistency was significantly correlated to the farinograph consistency (r = +0.97), as well as to hardness (r = +0.96) recorded on a General Foods Texturometer. The water required to prepare a chapati dough of this consistency can be determined from a semi-logarithmic plot of the extrusion time of doughs of varying water contents against the water added. Chapatti water absorption can be determined by multiplying the farinograph water absorption measured at 500 BU. by a factor of 0.85, or by adjusting the farinograph consistency to 460 plus or minus 20 BU at a lever setting of 1:3 instead of 1:1. A multiple regression equation, derived for predicting chapati water absorption based on particle size, damaged starch, and protein content, accounted for 88% of the variation. AS

Dough

2005 Endo (S), Okada (K) and Nagao (S). Studies on dough development III. Mixing characteristics of flour streams and their changes during dough mixing in the presence of chemicals. **Cereal Chemistry** 64(2); 1987; 110-115

Rheological properties of flour mill streams using a Brabender De Coder were studied. Effects were made to clarify the flour components that contribute to dough properties. In addition, the effects of some chemicals on the protein solubility and dough consistency were also studied. Results showed that flour components were distributed unevenly thereby playing a critical functional roles in dough mixing occuring during milling. Excess amount of chemicals (acetic acid, 1%. (v/v) 2-mercapto ethanol (ASP)) and bromate) and then combined effects with dough mixing promoted the unmasked SH groups. MVG

Pasta

2006 Albrecht (JA), Asp (EH) and Buzzard (IM). Contents and retentions of sodium and other minerals in pasta cooked in unsalted or salted water. **Cereal Chemistry** 64(2); 1987; 106-109

Snacks

2007 Blenford (D). Snackfood. Part II. Food 9(2); 1987; 23, 25

Highlights the nature of competition to traditional snack products. BV

MILK AND DAIRY PRODUCTS

2008 Salji (JP), Sawaya (WN) and Ayaz (M). The dairy processing industry in the central province of Saudi Arabia. Dairy and Food Sanitation 7(1);

1987; 6-13

Investigates production, processing and quality aspects of dairy products manufactured in the central province of Saudi Arabia. BV

Milk

2009 Abu-Lehia (IH). A simple and rapid colorimetric method for lactose determination in milk. **Food Chemistry** 24(3); 1987; 233-240

A simple and rapid technique for the estimation of lactose in fluid milk and whey, utilizing trichloroacetic acid (TCA) as a precipitating agent, is outlined. The colour development is based on the reaction of picric acid with lactose in the presence of phenol, sodium hydroxide and sodium bisulphate. This method can be completed within 10 min. There is no significant difference (P less than or equal to 0.05) between the results obtained by the proposed method and those obtained by the IDF method. AS

2010 Botha (WC), Luck (H) and Jooste (PJ). Determination of bacterial ATP in milk-the influence of adenosine triphosphate-hydrolyzing enzymes from somatic cells and Pseudomonas fluorescens. **Journal of Food Protection** 49(10); 1986; 822-825

2011 Chazal (M-P) and Chilliard (Y). Effect of breed of cow (Friesian and Montbeliarde) on spontaneous and induced lipolysis in milk. **Journal of Dairy Research** 54(1); 1987; 7-11

Levels of free fatty acids (FFA) were determined immediately after milking (initial FFA), and after 22 h storage at 4 C, either without (FFA-22) or with a mechanical induction of lipolysis (FFA-22I), in milk from Friesian and Montbeliarde cows in the same herd, at identical stages of lactation and pregnancy and receiving the same feeding regimes. There was no difference between the two breeds in intial FFA and FFA-22 contents whatever the lactation period. This was also true during late lactation when lipolysis was further increased after feeding a poor quality grass silage. The observation that milk FFA-22I content from the Montbeliarde cows was higher than that from Friesian cows in summer, but not in winter, requires cautious interpretation as the activation treatments were not comparable, owing to the different ambient temp. during activation in these two periods. AS

2012 Chazal (M-P), Chilliard (Y) and Coulon (J-B). Effect of nature of forage on spontaneous lipolysis in milk from cows in late lactation. **Journal of Dairy Research** 54(1); 1987; 13-18

2013 Christie (WW), Noble (RC) and Davies (G). Phospholipids in milk and dairy products. **Journal of the Society of Dairy Technology** 40(1); 1987; 10-12

A rapid HPLC method has been developed for the analysis of the phospholipids in milk and dairy products. A case of the phospholipids was obtained by chromatography on a cartridge of silica gel. The relative proportions of the different phospholipids were then determined by HPLC, and by means of the addition of an internal standard, dipalmitoyl phosphatidyl dimethylethanolamine, the absolute amounts present were also measured. KAR

2014 Dalgleish (DG), Pouliot (Y) and Paquin (P). Studies on the heat stability of milk. II. Association and dissociation of particles and the effect of added urea. **Journal of Dairy Research** 54(1); 1987; 39-49

The sizes of the casein particles in milk heated at 130 C were measured as functions of heating time and of initial pH. The effect of adding 10 mM-urea to the milks was also studied. Turbidities of the milks before and after dispersing the caseinate particles in 8 M-urea/EDTA/-Beta-mercaptoethanol were measured, the latter measurement giving an indication of the extent of covalent cross-linking. Urea was found to modify the behaviour of the milk: diameters of the caseinate particles were considerably altered, and the extent of covalent cross-linking was diminished. These results agree with the observation that more protein is solubilized from the casein micelles when urea is present, indicating that a competitive reaction scheme involving cross-linking in opposition to micellar dissociation may be responsible for the ultimate precipitation of milk by heat. AS

2015 Dalgleish (DG), Pouliot (Y) and Paquin (P). Studies on the heat stability of milk. I. Behaviour of divalent cations and phosphate in milks heated in a stainless steel system. **Journal of Dairy Research** 54(1); 1987; 29-37

2016 Donnelly (CW) and Baigent (GJ). Method for flow cytometric detection of **Listeria monocytogenes** in milk. **Applied and Environmental Microbiology** 52(4); 1986; 689-695

This report describes a method for the detection of **Listeria monocytogenes** in raw milk by flow cytometric analysis of fluorescently labelled bacterial populations. The use of immunofluorescence in combination with measures of DNA content by propidium iodide labeling and size by light scattering enabled specific identification of L. **monocytogenes** from **Streptococcus** faecalis, **Str. agalactiae, Str. uberis, Staphylococcus epidermidis**, and **Staph.** hyicus. Additional specific resolution of L. **monocytogenes** populations was achieved through selective enrichment of raw milk in **Listeria** enrichment broth. These procedures should permit the rapid screening of milk and other food samples for L. **monocytogenes** and eliminate many of the short-comings associated with conventional fluorescent antibody procedures. AS

2017 Donnelly (CW), Briggs (EH) and Scott Donnelly (L). Comparison of heat resistances of **Listeria monocytogenes** in milk as determined by two methods. **Journal of Food Protection** 50(1); 1987; 14-17

The thermal resistance of 3 strains of **Listeria monocytogenes** was compared using test tube versus sealed tube methods of thermal inactivation. All L. **monocytogenes** strains were rapidly inactivated in milk when survival was measured using sealed tube thermal inactivation methods. Calculated D_{62} C values ranged between 0.1-0.4 min. for the three strains tested. In contrast, total inactivation of L. **monocytogenes** populations using test tube methods of thermal inactivation could not be accomplished within 30 min. at 62 C. Extensive tailing of survivor curves was consistently observed. When an initial population of 5×10^6 L. **monocytogenes**/ml was heated at 72, 82, or 92 C, consistent survival of a population of 10^2-10^3 L. **monocytogenes**/ml after 30 min. was observed. The results prove that the test tube method for measuring thermal resistance of L. **monocytogenes** is inaccurate. Reports of extraordinary heat resistance based upon this method are correspondingly inaccurate. L. **monocytogenes** cells, dispersed freely in milk, will not survive pasteurization. AS

2018 Erbersdobler (HF), Dehn (B), Nangpal (A) and Reuter (H). Determination of furosine in heated milk as a measure of heat intensity during processing. **Journal of Dairy Research** 54(1); 1987; 147-151

2019 Frobish (RA), Bradley (BD), Wagner (DD), Long-Bradley (PE) and Hairston (H). Aflatoxin residues in milk of dairy cows after ingestion of naturally contaminated grain. **Journal of Food Protection** 49(10); 1986; 781-785

2020 Maxcy (RB) and Paul (RJ). Evaluation of the microbial quality of raw milk. **Journal of Food Protection** 50(1); 1987; 47-50

Commercial evaluation of the microbial quality of raw milk presents a major challenge, and new methods are burdened by being compared to imprecise presently used standard methods. Extensive comparisons in commercial and research laboratory environments were made using a method that involved direct enumeration of single cells in comparison to colony forming units. The correlations were from 0.50 to 0.99 depending on treatment of the data. Repetition of all tests on milk from individual farms indicated that inherent variation in quality at the farm, sampling, testing, and evaluating the results showed the extreme inadequacy of the presently established methods of grading raw milk. More frequent tests with appropriate averaging would improve the likelihood of correct decisions on quality grade. AS

2021 McManus (C) and Lanier (JM). Salmonella, Campylobacter jejuni, and **Yersinia enterocolitica** in raw milk. **Journal of Food Protection** 50(1); 1987; 51-55

Raw milk samples collected from bulk tank trucks of milk suppliers in Wisconsin, Michigan, and Illinois were analyzed for **Salmonella, Campylobacter jejuni**, and **Yersinia enterocolitica**. **Salmonella** spp. were isolated from 32 (4.7%) of 678 samples, and **Camp. jejuni** was found in one (0.4%) of 237 samples. Although **Y. enterocolitica** was recovered from 114 (48.1%) of 237 samples, all isolates were environmental, nonvirulent strains. AS

2022 Sarkar (BC), Singh (BPN) and Maharaj Narain. Milk scale deposition on heated surface under laminar flow. **Journal of Food Science and Technology, India** 24(2); 1987; 73-77

Milk scale deposition on heated surface under laminar flow conditions was studied. The experimental system consisted of an electrically heated stainless steel section of 22.86 mm dia. fitted concentrically to a 25.4 mm diameter glass tube. Experiments were conducted on fresh cow's milk. Results have shown that the deposition of milk began after an average induction period of 12.18 min. The rate of deposition decreased exponentially with increase in Reynolds number. The thermal conductivity and density of milk scale were also evaluated and the values were 0.0043 W/m-K and 1.3889 g/cm^3 resp. The milk scale contained 35-40% protein, 12-13% fat and 22% ash. KAR

2023 Schmidt (D). Milk concentration by reverse osmosis. **Food Technology in Australia** 39(1); 1987; 24-26

Milk products

2024 Saxelin (M-L), Nurmiaho-Lassila (E-L), Merilainen (VT) and Forsen (RI). Ultrastructure and host specificity of bacteriophages of **Streptococcus cremoris, Streptococcus lactis** subsp. **diacetylactis**, and **Leuconostoc cremoris** from Finnish fermented milk "Viili". **Applied and Environmental Microbiology** 52(4); 1986; 771-777

"Viili," a fermented milk product, has a firm but viscous consistency. It is produced with traditional mesophilic mixed-strain starters, which have various stabilities in dairy practice. Thirteen morphologically different types of phages were found in 90 **viili** samples studied by electron microscopy. Ten of the phage types had isometric heads with long noncontractile tails, two had elongated heads with long, noncontractile tails, and one had a unique, very long elongated head with a short tail. Further morphological differences were found in the tail size and in the presence or absence of a collar, a baseplate, and a tail fiber. To find hosts for the industrially significant phages, we examined the sensitivities of 500 bacterial isolates from starters of the viili. Seven of the phages attacked **Streptococcus cremoris** strains, three attacked **S. lactis** subsp. **diacetylactis** strains, and four attacked **Leuconostoc cremoris** strains. Some phages differed only in their host specificity. Hosts were not found for 4 of the 13 morphological types of phages. AS

Cheese

2025 Cayle (T), Guth (JH), Hynes (JT), Kolen (EP) and Stern (ML). Penicillin distribution during cheese manufacture and membrane treatment of whey. **Journal of Food Protection** 49(10); 1986; 796-798

Milk containing 0.005 U of benzyl 14C-penicillin G was used to make Cheddar cheese, and the whey was subsequently treated with ultrafiltration (UF) and reverse osmosis (RO). The distribution of labelled penicillin was monitored throughout milk and whey processing. The antibiotic concentrated in the moisture phases. Eight-six % was recovered from the whey fraction, and approx. 12% from the cheese. Similar distribution patterns was detected for the whey UF permeate and retentate; 84% of the penicillin was in the permeate, and 19% remained in the etentate. The balance of penicillin was recovered primarily in the RO retentate fraction. AS

2026 Davey (KR). Measurement of the hardness and mouthfeel of cheese using a sliding pin consistometer. **Journal of Texture Studies** 17(3); 1986; 267-274

A sliding pin consistometer (SPC) was used to differentiate between six commercial cheese products, including a hard, mature Cheddar and a soft, cream cheese, at a number of temp. in the range 0.8 to 25.0 C. Average force values (F_f) decreased with increasing temp. and with decreasing relative cheese hardness. Measurements were also made on six Cheddar cheeses with a range of salt to moisture (s/m) ratio (2.95 x 10^{-2} to 5.57 x 10^{-2}) at a sample temp. of 16 C at maturation periods of 22, 58, 100 and 183 days. A panel of 27 adults scored the hardness and mouthfeel of these samples at these maturation periods using 9-point scoring scales. The SPC discriminated between samples and maturation periods and was more discrimianting than the subjective evaluation of panelists. Mean F_f values decreased with maturation and increased linearly with increasing s/m. Panelists hardness scores increased with s/m but were not influenced significantly by maturation. Mouthfeel increased with maturation and was a max. at a s/m of between 4.36 x 10^{-2} and 4.57 x 10^{-2}. The SPC provides objective information that could be useful in assessing the effect of treatment on cheese. AS

2027 Doyle (MP) and Schoeni (JL). Comparison of procedures for isolating **Listeria monocytogenes** in soft, surface-ripened cheese. **Journal of Food Protection** 50(1); 1987; 4-6

Three enrichment procedures a) cold enrichment b) FDA enrichment procedure and c) selective enrichment procedure of Doyle and Schoeni, were compared in regard to isolating L. monocytogenes from cheese. Of the 90 samples assayed, the organism was isolated from 41 samples out of which only 9 samples gave positive isolation by more than one procedure. Most isolation (21) were made by the procedure with 16 and 13 isolation made (b) and (c) procedures. In most instances, the organism was isolated by only one procedure. MVG

2028 Omar (MM), Abdel Baky (AA), Rabie (AM) and Ashour (MM). Free fatty acids and quality of Domiati cheese made from dried milks as affected by added lipase. **Food Chemistry** 24(3); 1987; 197-201

Treatment of reconstituted milk with Italase, at a level of 0.02% enhanced the formation of free fatty acids and this was associated with improvement in cheese flavour. Thus the levels of free fatty acids and flavour intensities of dried milk cheese with added lipase approached or even extended those of fruit milk cheese of the same pickling period. KAR

2029 Ryser (ET) and Marth (EH). Behaviour of **Listeria monocytogenes** during the manufacture and ripening of cheddar cheese. **Journal of Food Protection** 50(1); 1987; 7-13

Results showed that it was necessary to ripen the cheese made from raw or heat-treated milk, for atleast 60 days at 1.7 C. However, it was made clear that this ripening process will not assure consumers of a safe product if cheese was made from milk which initially contained certain pathogens. MVG

Cheese whey

2030 Barford (JP), Cail (RG), Callander (IJ) and Floyd (EJ). Anaerobic digestion of high-strength cheese whey utilizing semicontinuous digesters and chemical flocculant addition. **Biotechnology and Bioengineering** 28(11); 1986; 1601-1607

High strength whey was treated anaerobically using semicontinuous digesters (70 kg/m^3 COD). A maximum loading of 16.1 kg COD/M^3 / day was obtained with soluble COD removal efficiencies of more than 99%. Increased biomass conc. was obtained by the use of a chemical flocculant, thus enabling corresponding higher loadings to be applied. The flocculant dosage could be discontinued with the on set of substantial granulation of the biomass. The performance details of digesters and the long-term operational difficulties experiened and the control strategies employed on such system are discussed. MVG

Panner

2031 Vishweshwaraiah (L). Studies on dehydration and deep freezing of **paneer**. **Journal of Food Science and Technology, India** 24(2); 1987; 95-96

Paneer (an acid coagulated milk product of India used in culinary) with 0.5, 1.0 and 2.0 cm^3 was prepared and dried at 75 C. They were also extruded with dies of 1, 2, and 4 mm dia. and dried. **Paneer** was also subjected to deep freeze at -9 and -15 C. **Paneer** dried for 3-4 h contained 15-18% moisture. The cubes did not keep well beyond 15 days. The extruded **paneer** had 5-9% moisture and it could be stored for 2 months. Deep frozen **paneer** showed surface hardening in 8 days limiting its usage. Samples deep frozen at -9 and -15 C did not show much difference in their sensory attributes. KAR

Whey

2032 Bissonnette (N), Lalande (R) and Bordeleau (LM). Large-scale production of **Rhizobium meliloti** on whey. **Applied and Environmental Microbiology** 52(4); 1986; 838-841

Whey, a by-product of the cheese industry, can sustain the growth of fast-growing Rhizobia. To avoid any latency of growth, Rhizobial inoculum must be prepared under inducing conditions. In unsupplemented whey, the number of cells of **Rhizobium meliloti** Balsac reached 5 x 10^9 CFU/ml in 48 h of incubation. This is comparable to the yield obtained with yeast-mannitol broth, the standard medium for the growth of rhizobia. In raw whey supplemented with yeast extract (1.0 g/liter) and phosphate (0.5 g/liter), the number of cells reached 10^{10} CFU/ml in 48 h of incubation. This is a two fold increase compared with the population normally obtained in industrial production. Whey represents a relatively inexpensive and efficient substrate medium for the large-scale production of fast-growing rhizobia. AS

2033 Gagrani (RL), Rathi (SD) and Ingle (UM). Preparation of fruit flavoured beverage from whey. **Journal of Food Science and Technology, India** 24(2); 1987; 93-94

Whey beverage with 0.5% acidity and 20 brix free of proteins and fat was prepared and mixed with orange, pineapple, guava, and mango juices at 10, 15, 20 and 25% of whey. The whey beverage was served to 5 selected judges. In each of the fruit juices highest score was recorded in case of 10% fruit juice for orange, 15% of pineapple, 25% of guava and 15% of mango. Of the different fruit juices highest score was recorded for mango flavoured whey beverage followed by pineapple, orange, and guava. Whey based mango beverage scored max. value for colour, sedimentation, turbidity and viscosity. KAR

MEAT AND POULTRY

Meat

2034 Csapo (J) and Csapo-Kiss (Zs). Ion exchange column chromatography for the determination of keratin in meat meals. **Acta Alimentaria** 15(2); 1986; 137-150

Attempts were made to determine the keratin content in meat meals by different methods of ion-exchange chromatography. The chemical composition of the analysed feather and meat as well as feather meal and meat meal samples did not permit the detn. of keratin. On the other hand the amino acid composition, particularly the cysteine content and the indices Cys per Lys X His X Met and Cys x Ser per Lys X His X Met calculated from the amino acid composition permitted the detection of 2-3% feather meal mixed to meat meal. Even 1-2% previously non-hydrolyzed feather meal could be detected by protein fraction analysis. AS

2035 Hastings (JW), Holzapfel (WH) and Niemand (JC). Radiation resistance of Lactobacilli isolated from radurized meat relative to growth and environment. **Applied and Environmental Microbiology** 52(4); 1986; 898-901

Of 113 lactobacilli isolated from radurized (5kGy) minced meat, 7 **Lactobacillus** sake strains, L. curvatus strain, and **L. farciminis** strain were used for radiation resistance studies in a semisynthetic substrate(i.e., modified MRS broth). Five reference **Lactobacillus** spp., one **Staphylococcus aureus** strain, and one **Salmonella tryphimurium** strain were used for comparative purposes. All **L. sake** isolates exhibited the phenonmenon of being more resistant to gamma-irradiation in the exponential (log) phase than in the stationary phase of their growth cycles by a factor of 28%. Four reference strains also exhibited this phenomenon, with **L. sake** (DSM 20017) showing a 68% increase in resistance in the log phase over the stationary phase. This phenomenon was not common to all bacteria tested and is not common to all strains with high radiation resistance. Four **L. sake** isolates and three reference strains were used in radiation sensitivity testing in a natural food system (i.e., meat). The bacteria were irradiated in minced meat and packaged under four different conditions (air, vacuum, carbon dioxide and nitrogen). Organisms exhibited the highest death rate (lowest D_{10} values [doses required to reduce the logarithm of the bacterial population by 1]) under carbon dioxide packaging conditions, but resistance to irradiation was increased under nitrogen. The D values of the isolates were generally greater than those of the reference strains. The D_{10} values were also higher (approx. two times) in meat than in a semisynthetic growth medium. AS

2036 Roozen (JP). Effects of types I, II and III antioxidants on phospholipid oxidation in meat model for warmed over flavour. **Food Chemistry** 24(3); 1987; 167-185

Freeze-dried, washed ground meat was mixed with lecithin and antioxidants dissolved in water, heated and then stored in the refrigerator in order to study phospholipid oxidation as related to warmed over flavour. Type I and II antioxidants decreased the amount of thiobarbituric acid reactive substances, while most Type III's gave an increase, depending on their concn. Similar effects on phospholipid oxidation were detected with capillary gas chromatography for representatives of each type of antioxidant, i.e. butylated hydroxy anisole, ethylenediaminetetraacetic acid, sodium bisuphate, cysteine and water activity regulators. AS

2037 Winstanley. Chilled to the bone. **Food** 9(2); 1987; 55, 57, 59

Review covers the factors affecting the efficiency of carcass chilling; capital expenditure and energy costs of the rapid chill system; and the choice of spiral chillers for cooked meat products. BV

Beef

2038 Rhee (KS) and Ziprin (YA). Lipid oxidation in retail beef, pork and chicken muscles as affected by concentrations of heme pigments and nonheme iron and microsomal enzymic lipid peroxidation activity. **Journal of Food Biochemistry** 11(1); 1987; 1-15

Muscles of beef, pork and chicken purchased in two seasons were analyzed for lipid oxidation potential, concn. of total pigments, myoglobin and nonheme iron, and microsomal enzymic lipid peroxidation activity. To determine lipid oxidation potential, thiobarbituric acid (TBA) assays with antioxidant protection were conducted on raw and cooked comminuted muscles stored at 4 C. TBA values of raw chicken muscles (white and dark) and pork muscles were low and changed little during 2-6 days of storage, whereas the values of raw beef muscles were higher and increased progressively. However TBA values of cooked muscles of all three species increased during 2-4 days of storage with no marked differences among the species. Total pigment and myoglobin concn. best explained the differences in TBA values of stored, raw muscles among the three species. AS

2039 Takahashi (G), Wang (S-M), Lochner (JV) and Marsh (BB). Effects of 2-Hz and 60-Hz electrical stimulation on the microstructure of beef. **Meat Science** 19(1); 1987; 65-76

Pork

2040 Greer (GG) and Dilts (BD). Effect of bast chilling on the bacterial quality and case life of pork. **Canadian Institute of Food Science and Technology Journal** 20(2); 1987; 94-97

The current investigation has provided evidence that bast chilling, under commercial conditions, did not significantly affect bacterial condition or spoilage potential of fresh pork. MVG

2041 Gumpen (SA) and Sorheim (O). Presalting effects on water retention of pork and beef batters. **Food Chemistry** 23(3); 1987; 235-243

Presalting (ground meat/salt/water = 100/3/20, by wt 24 h) as compared with direct salting in the chopper, substantially reduced the cooking loss of pork batters, but only when the batters were relatively coarsely choped with more extensive chopping (exceeding 10-15 min at low chopper speed) no presalting effects were found, indicating that salt diffusion, protein dissolution and myofibril swelling were completed also in control batters salted in the chopper. KAR

2042 Moller (AJ) and Vestergaard (T). Effect of delay time before chilling on toughness in pork with high or low initial pH. **Meat Science** 19(1); 1987; 27-37

The potential cold induced toughning in pork loins showing different extent of pH fall prior to chilling has been investigated. Also, the effect of introducing a delay time before sides are transferred to the chilling tunnel operating at -28 C to -22 C has been studied on muscles from carcasses at various times post stunning. MVG

2043 Shahidi (F), Yun (J), Rubin (LJ) and Wood (DF). The hexanal content as an indicator of oxidative stability and flavour acceptability in cooked ground pork. **Canadian Institute of Food Science and Technology Journal** 20(2); 1987; 104-106

The hexanal content, flavour acceptablity, and oxidative stability of meats treated with different additives were evaluated. The additives included sodium ascorbate, sodium tripolyphosphate, sodium nitrite, BHA, and TBHQ, individually or in combination. The results indicated that the hexanal content, sensory scores, and TBA numbers of treated meats were linearly interrelated. The correlation coeff. for the linear relationship between the relative hexanal content and the TBA numbers for meat cooked with different additives was 0.995. Flavour acceptability decreased as TBA numbers or hexanal content increased. AS

2044 Willemot (C), Fillion-Delorme (N) and Wood (DF). Effect of nitrite on lipid degradation during storage of cooked pork meat. **Canadian Institute of Food Science and Technology Journal** 20(2); 1987; 70-74

The effect of treatment into 150 p.p.m. sodium nitrite on lipid degradation upon cooked (75 C) refrigerated storage (4 C) of ground pork meat was studied. Nitrite prevented oxidative breakdown of lipids during storage. Neither storage nor nitrite treatment affected triglycerides. Nitrite prevented formation of an unidentified lipid compound on storage. Cooking caused a large decrease in polar lipid PUFA content and with nitrite prevented the increase in TBA numbers and lipid fluorescence but did not decrease the levels of polar lipid PUFAs. Nitrite inhibited the breakdown of intermediate oxidation products without any delay in initial steps of PUFA oxidation. Increase in FFA content, really high levels of PUFAs in this fraction, and decrease in FFA-PUFA's during storage of the nitrite treated samples suggested that FFAs are the important intermediates in the oxidative degradation of polar lipids. Lipid fluorescence showed the same trend as TBA numbers as a measure of PUFA oxidation. MVG

Bacon

2045 Anon. Bacon: The importance of temperature control. **Food Manufacture** 62(2); 1987; 39-40

Discusses optimal slicing temp. of bacon and how temp. at slicing affects the yield and quality of bacon. BV

Ham

2046 Kormendy (L), Rekasi (E) and Fetter (I). Determination of the extent of heat treatment in canned hams by use of the phosphatase test. **Meat Science** 19(1); 1987; 77-79

2047 Marriott (NG), Graham (PP), Shaffer (CK) and Phelps (SK). Accelerated production of dry cured hams. **Meat Science** 19(1); 1987; 53-64

Ten uncured legs from the right side of the sampled pork carcasses (Study A) were vacuum tumbled with the cure adjuncts for 30 min. (T) and 10 counterparts from the left side were tumbled 30 min, rested 30 min and tumbled an additional 30 min (TRT). Evaluations were conducted at 40 and 70 days after cure application for colour, taste attributes, percentage moisture, percentage salt and nitrate^{-1} and nitrite^{-1} content. Study B was the same except that 18 legs were boned, tumbled and cured for 40, 56 and 70 days. The TRT samples (Study A) at 40 days sustained less colour fading ($P < 0.05$) during cookery, but no differences ($P > 0.05$) existed among the uncooked hams. Increased cure time enhanced moisture loss and salt content (Study A) and colour retention during cookery (Study B). The TRT samples had increased moisture loss and salt content (Study A). AS

Swine

2048 Lundberg (P), Vogel (HJ), Fabiansson (S) and Ruderus (H). Post-mortem metabolism in fresh porcine, ovine and frozen bovine muscle. **Meat Science** 19(1); 1987; 1-14

Rabbits

2049 Deltoro (J) and Lopez (AM). Changes in the chemical composition of rabbit meat during growth. **Meat Science** 19(1); 1987; 15-25

Meat products

2050 Kafel (S) and Jozwik (E). Effect of a short cold storage on frequency of spoilage in pasteurized (perishable) canned meat products subjected to the incubation test. **Journal of Food Protection** 50(1); 1987; 56-58

Investigations were carried out in 6 meat processing plants in Poland on the effect of a short storage period on the results of the incubation test of various canned pasteurized meat products. From the daily consignments, 1% of the cans was reserved with in 1-3 days of production and incubated at 37 C for 3 days. The remaining cans of the consignments were stored at around 8 C. When spoilage resulted in one or more of the incubated cans from any consignment, about 2% of other cans from that consignment were taken, and the incubation test was repeated. These later incubation tests were initiated 7-10 days after the date of production. From among 4,322 cans subjected to first incubation test 980 (22.67%) produced swells but in the repeated incubation carried out on 8,290 cans only 347 (4.18%) became swollen. It is concluded that the bacteria responsible for spoilage of canned pasteurized meat products may disappear or lose their ability to spoil these products during the storage under refrigeration. AS

Frankfurters

2051 Skinner (GE) and Rao (VNM). Linear viscoelastic behaviour of frankfurters. **Journal of Texture Studies** 17(4); 1987; 421-432

Normal creep and stress relaxation experiments were performed on seven commercial brands of frankfurters. A nonlinear procedure was used to determine the model best fitting the data for each test. The assumption of linear viscoelasticity was tested by the equivalence of model parameters. Results showed frankfurters to be linear viscoelastic materials at strain level up to 3.8% AS

Sausages

2052 Al-Jalay (B), Blank (G), McConnell (B) and Al-Khayat (M). Antioxidant activity of selected spices used in fermented meat sausage. **Journal of Food Protection** 50(1); 1987; 25-27

Poultry

2053 Norred (WP), Cole (RJ), Dorner (JW) and Lansden (JA). Liquid chromatographic determination of cyclopiazonic acid in poultry meat. **Journal of the Association of Official Analytical Chemists** 70(1); 1987; 121-123

The newly developed method is based on ligand-exchange chromatography (LC), and is a modification of methods used for determining cyclopiazonic acid (CPA) in peanuts and tenuazonic acid in tomato paste. A mini column cleanup step has been developed which removes interfering compounds of muscle at relatively little expense to recover. MVG

Chickens

Hens

2054 Kondaiah (N), Panda (B) and Anjaneyulu (ASR). Meat yields and quality characteristics of meat from spent hens of White Leghorn and Rhode Island Red breeds. **Journal of Food Science and Technology, India** 24(2); 1987; 78-81

Wt. of various components were recorded of White Leghorn, light type (WLL) and White Leghorn, heavy type (WLH) and Rhode Island Red (RIR) after hand deboning the dressed birds in hot condition. Significant differences between breed groups were observed for leg meat, deboned meat, deboned meat % of live and dressed wt. and fat % of dressed wt. A unit wt. of live bird or dressed carcass from RIR spent hen resulted in a significantly higher deboned meat yield than WLH or glucose and sucrose. Sodium phosphate was the more effective salt in reducing viscosity followed by sodium chloride and calcium chloride. When salts were added, an inverse relationship was obtained between viscosity and water-holding capacity of gelled soy protein slurries. AS

1977 Sato (K), Yamagishi (T), Kamata (Y) and Yamauchi (P). Subunit structure and immunological properties of a basic 7S globulin from soybean seeds. **Phytochemistry** 26(4); 1987; 903-908

Basic 7S globulin from defatted soybean (var. Miyagishirome) meal was isolated from the 0.5 M NaCl-soluble fraction by ion-exchange chromatography on CM-Sepharose CL-6B. The basic 7S globulin was distinguished immunologically from the other soybean proteins. SDS-urea gel electrophoresis of basic 7S globulin gave two kinds of subunits (M_r 16000 and 26000), designated as LMWS (low M_r subunit) and HMWS (high M_r subunit), respectively in the presence of a 2-mercaptoethanol (2-ME)-containing system. They gave only one intermediary subunit (M_r 42,000) without 2-ME. Two kinds of HMWS (H-I and H-II) and two kinds of LMWS (L-I and L-II) were separated by polyacrylamide gel electrophoresis in a urea-acetic acid system. The basic 7S globulin was fractionated into two components (designated as basic 7S-I and basic 7S-II) on CM-Sepharose CL-6B. The subunits of basic 7S-I and basic 7S-II comprising H-I and L-I, and H-II and L-II, respectively. AS

TUBERS AND VEGETABLES

Root vegetables

Onions

1978 Piccini (JL), Evans (DR) and Quaranta (HO). L-Malate content in irradiated onions (**Allium cepa** L.) cv.**Valenciana sintetica** 14. **Journal of Food Science and Technology, India** 24(2); 1987; 91-93

Onion (**Allium cepa** L.) bulbs of cv. **Valenciana sintetica** 14 were irradiated 30 days after harvest with 0.03 kGy (3 krad) and stored for 268 days at day temp. of 33 to 15 C and night temp. of 18 to 1 C with 60-85% RH range and examined for sprouted bulbs and malate content at periodical intervals. After 268 days the sprouted bulbs were 80.0% in control and 5.8% in irradiated samples. Malate content in unirradiated onions steadily reaching 2.72 g/100 g powder after the 268th day whereas in irradiated onions, it increased upto the 150th day to 2.57 g/100 g powder and declined to 2.08 g/100 g powder on the 268th day. It is concluded that a peak in malate content near the 150th day of storage followed by a decline and if the sprouted bulbs are < 1.0% then it is suggestive of the samples being irradiated. KAR

Tubers

Cassava

Cassava starch

1979 Iwunze (MO) and Nnodimele (RA). An evaluation of cassava starch as a gelling material for electrochemical salt bridges. **Starch/Starke** 38(6); 1986; 193-194

Potatoes

Potato starch

1980 Janas (P) and Tomasik (P). Rheological studies on potato starch pastes at low concentrations. Part I. Pasting characteristics. **Starch/Starke** 38(6); 1986; 185-188

A novel approach is demonstrated to the detn. of pasting characteristics. Using a rotatory viscometer, measurements are carried out at constant torque and varying angular speed of rotation . Applied device allows application of low torque, and in consequence studies of starch pastes at low concn. became available. A model is proposed for characteristics of pastes which involves two parameters independent of measurement conditions. AS

1981 Janas (P) and Tomasik (P). Rheological studies on potato starch pastes at low concentrations. Part II. Rheological properties of starch pastes. **Starch/Starke** 38(6); 1986; 189-192

Measurements carried out on starch pastes of low concn. point to the reasons of unstability of such pastes. They undergo rheodestruction, rheopexy and seasoning. Method is proposed of detn. of real flow curves of starch pastes from hysteresis. AS

1982 Palasinski (M), Tomasik (P) and Wiejak (S). Thermolysis of carbohydrates in oxygen-free atmosphere. Part II. British gum formation. **Starch/Starke** 38(7); 1986; 221-224

Potato starch was heated to 190, 200 and 210 C in oxygen-free atmosphere (nitrogen and carbon dioxide) and in the air for comparison. The atmosphere has some influence upon the course of the process as well as properties of resulting British gums. AS

Vegetables

Gourds

Buffalo gourd

1983 Butler (LE), Christianson (DD), Scheerens (JC) and Berry (JW). Buffalo gourd root starch. Part IV. Properties of hydroxypropyl derivatives. **Starch/Starke** 38(5); 1986; 156-159

The root starch of **Cucurbita foetidissima**, or buffalo gourd, has physicochemical characteristics intermediate to those of cassava and maize. However, unlike other root starches, buffalo gourd starch pastes retain peak viscosity under application of stress. Nutritional and organoleptic evaluation have shown suitability of this starch for food use. Buffalo gourd starch pastes retrograde when subjected to low temp. storage to a degree similar to that of maize. Stabilization of buffalo gourd starch (DS 0.04, 0.05, 0.06) with propylene oxide protects against the retrogradtive response. Rheological examination of hydroxypropylated buffalo gourd starch shows depressed initial pasting temp., with increased and sustained viscosity throughout the pasting cycle. AS

Pumpkins

1984 Hidaka (T), Anno (T) and Nakatsu (S). The composition and vitamin A value of the carotenoids of pumpkins of different colours. Journal of damage of postmortem muscle during storage at 0 and -3 C. **Journal of Food Biochemistry** 11(1); 1987; 69-93

The objectives of the study was to determine whether the freezing point of cod muscle and its susceptibility to biochemical damage during partial freezing varies with season of hearvest or temp. acclimation of the live fish. MVG

Hake

2064 Owusu-Ansah (YJ) and Hultin (HO). Effect of **in situ** formaldehyde production on solubility and cross-linking of proteins of minced red hake muscle during frozen storage. **Journal of Food Biochemistry** 11(1); 1987; 17-39

Data obtained in this investigation indicate that cross-linking of protein components occurs as well as hydrolysis of a considerable amount of protein. MVG

Pogonias cromis

2065 Lannelongue (M) and Finne (G). Effect of carbon dioxide on growth-rates of selected microorganisms isolated from black drum (**Pogonias cromis**). **Journal of Food Protection** 49(10); 1986; 806-810

The effect of carbon dioxide (25-100%) enriched atm. on growth rates of coryneform bacterium, **Micrococcus varians**, a **Vibrio** sp., a **Moraxella** sp. and **Pseudomonas fluorescens** growing on trypticase soy agar at 4 and 25 C was investigated. Growth rates were determined by measuring the rate of increase in the diameter of colonies on plates packed in laminated plastic pouches containing the carbon dioxide-enriched environments. Carbon dioxide caused a significant decrease in the growth rates of all the organisms and the inhibitory effect was greatly enhanced by low temp. At 25 C, the gram-positive organisms were more resistant to carbon dioxide than the gram-negative organisms, while at 4 C none of the organisms grew in 25% carbon dioxide, the lowest concn. tested. When exposed to air after being incubated in carbon dioxide-enriched environments, the organisms in most instances grew at normal rates indicating limited residual effect of carbon dioxide. The effect of temp. on relative carbon dioxide inhibition was investigated in detail for the **Moraxella** sp. and **P. fluorescens**. In an atm. containing 25% carbon dioxide in air at 20 C both organisms showed approx. 25% inhibition as compared to growth in air at the same temp. while at 10 C **P. fluorescens** was completely inhibited and the **Moraxella** sp. showed 95% inhibition. AS

Trouts

2066 Teran (MT) and Sierra (M). Organochlorine insecticides in trout, **Salmo trutta fario** L., taken from four rivers in Leon, Spain. **Bulletin of Environmental Contamination and Toxicology** 38(2); 1987; 247-253

Salmon

2067 Ohyama (S), Inamasu (T), Ishizawa (M), Ishinishi (N) and Matsuura (K). Mutagenicity of human urine after the consumption of fried salted salmon. **Food and Chemical Toxicology** 25(2); 1987; 147-153

Shrimp

2068 Bandekar (JR), Chander (R) and Nerkar (DP). Radiation control of **Vibrio parahaemolyticus** in shrimp. **Journal of Food Safety** 8(2); 1987;

83-88

The effectiveness of a radicidation process using 1 kGy of gamma radiation was evaluated with respect to the destruction of **Vibrio parahaemolyticus** contamination in shrimp. D_{10} values of this pathogen ranged from 0.03 kGy in frozen buffer to 0.10 kGy in naturally contaminated frozen shrimp. The efficacy of the process was demonstrated. AS

PROTEIN FOODS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

2069 Sjoberg (A-MK) and Alanko (TA). Liquid chromatographic determination of saccharin in beverages and sweets: NMKL collaborative study. **Journal of the Association of Official Analytical Chemists** 70(1); 1987; 58-60

Saccharin was extracted into water and ethanol and chromatographed using modified liquid chromatographic method. The reproducibility coeff. of variation was 12.4% for sweets. MVG

Alcoholic beverages

Beer

2070 Delcour (JA), Van Roey (G) and Delvaux (F). The effects of gamma-irradiation of Pilsner beer. **Journal of the Institute of Brewing** 92(6); 1986; 591-593

A commercial Belgian Pilsner beer was irradiated with 0, 40, 80 and 120 krad of Cesium^{137} **Gamma**-rays. Analysis of the resultant beers showed that the analytical data for polyphenolics to a great extent had remained unaffected, that the treatment had no impact upon the liability to haze formation, the pH, the foam stability and the levels of dimethyl sulphide, ethyl acetate, isoamyl acetate, and diacetyl. There was an increase in the concn. of acetaldehyde, and a small decrease in the concn. of iso-**Alpha**-acids and n-propanol, the changes being roughly proportional to the dosage applied. The sum of the fast and the moderately fast reducing agents increases with increasing irradiation dosages and in the same way the concn. of slow reducing agents diminishes. The treatment at the same time leads to a drastic loss of colour. The flavour of irradiated beer is totally unacceptable, even at the lowest dosages, the odour remaining one of hydrogen sulphide. AS

2071 Johnstone (DIH). Beer packaging in can (Review). **Journal of the Institute of Brewing** 92(6); 1986; 529-536

Covers early history; post war development; development in the eighties; quality control; and the future. BV

2072 Lowe (CM) and Elkin (WI). Beer packaging in glass and recent development (Review). **Journal of the Institute of Brewing** 92(6); 1986; 517-528

Covers historical aspect; bottling hall layout; depalletising; decrating; bottle conveying and line control; sorting; washing; inspection; filling and crowning; pasteurizing; labelling and final inspection; packaging and palletising; quality control; and environment. BV

2073 Nelson (G) and Young (TW). Yeast extracellular proteolytic enzymes for chill-proofing beer. **Journal of the Institute of Brewing** 92(6); 1986; 599-603

Yeast belonging to various genera were screened for extracelluar protease activity. Of the 119 strains examined the most prolific protease producers belonged to the genera **Candida**, **Kluyveromyces** and **Hansenula**. No strains of **Saccharomyces** were found to secrete protease. In general only those proteases secreted by the genus **Candida** possessed chill-proofing activity. However one strain of **Debaryomyces** and one of **Pichia** also produced proteases with chill-proofing activity. AS

2074 Pickerell (ATW). The influence of free alpha-amino nitrogen in sorghum beer fermentations. **Journal of the Institute of Brewing** 92(6); 1986; 568-571

The interactions of wort free Alpha-amino N (FAN) and sugar in sorghum beer fermentations were quantified and a simple equation derived. This equation describes the wort FAN demand as a function of the sugar concn. necessary to produce a fully fermented beer within 48 h. The influence of wort FAN on sorghum beer fermentations had not been quantified so research was undertaken to define sorghum beer yeasts' requirement for wort FAN and the interactions that occur between wort FAN and sugar. Laboratory, sorghum malt and adjunct, worts mashed to cover a wide range of FAN and wort sugar concn., were fermented and analysed. The initial wort FAN affects the ethanol production rate, FAN uptake and sugar utilisation rates. AS

Brewer's yeast

2075 Bilinski (CA), Russell (I) and Stewart (GG). Analysis of sporulation in brewer's yeast Induction of tetrad formation **Journal of the Institute of Brewing** 92(6); 1986; 594-598

2076 Stewart (GG) and Russell (I). One hundred years of yeast research and development in the brewing industry. **Journal of the Institute of Brewing** 92(6); 1986; 537-558

Reviews the early research and development; recent research on brewer's yeast strains; genetic manipulation techniques; wort sugar uptake; antimicrobial activity; flocculation; yeast storage conditions influence on intracellular glycogen levels; fermentation of high gravity worts; yeast excretion products; alcohols; esters; carbonyl compounds; diacetyl and pentane-2,3-dione; sulphur compounds; Low carbohydrate (reduced caloric) lite beer; diastatic yeasts for distilled ethanol production; immobilized yeast in brewery fermentations; and genetic engineering. BV

Hops

2077 Daoud (IS) and Kusinski (S). Process aspects of the extraction of hops with liquid carbon dioxide. **Journal of the Institute of Brewing** 92(6); 1986; 559-567

The time course of the extraction of Alpha-acids by liquid carbon dioxide was investigated and it has been established that there are two zones with greatly differing rates of extraction. The rate in the first zone is governed by 'solubility' effects, while in the second zone the rate is limited by 'diffusional' effects. Consequently the rate of extraction in the first zone depends upon the flow rate of liquid carbon dioxide while that in the second zone depends upon the time of extraction. The effects on extraction performance of the depth of the bed of hops and the extent of milling were also explored. AS

2078 Van de Velde (N) and Verzele (M). High performance liquid chromatography of hop and beer extracts with photodiode array detection. **Journal of the Institute of Brewing** 92(6); 1986; 584-587

Reversed phase high performance liquid chromatography with photodiode array detection allows easy location in hops extract chromatograms of two deoxy-Alpha-acids and in beer extract chromatograms of cohulupone and hulupone. AS

Malt

2079 Allison (MJ). Relationships between milling energy and hot water extract values of malts from some modern barleys and their parental cultivars. **Journal of the Institute of Brewing** 92(6); 1986; 604-607

2080 Moll (M) and Flayeux (R). Comparison of different malt analyses. **Journal of the Institute of Brewing** 92(6); 1986; 572-583

The results of applying three types of analytical mashing procedure - Institute of Brewing, European Brewery Convention and Tepral systems - to the same malts are examined. Statistical correlations of the results are made. It is concluded that the main difference between the results of the Tepral method and the other two procedures is that the first gives much lower extracts when applied to malts which would be likely to be troublesome in the brewery, and is thus more discriminatory for these. The advantages of including sparging in an analytical method are pointed out. AS

Vegetable cocktails

2081 Zetelaki-Horvath (K). Cocktaïls prepared from enzymatically solubilized vegetables and fruits. **Acta Alimentaria** 15(2); 1986; 151-161

Consumption of fibrous vegetable juices, containing natural nutrients, vitamins and minerals, might be efficient means of the preservation of health. Three vegetable cocktails (red beet-horseradish-paprika; celery-horseradish; tomato-paprika-celery-carrot) and two vegetable-fruit cocktails (apple-carrot-apricot; squash-orange) were prepared from vegetable and fruit nectars, produced by macerating enzyme. Chemical composition of the cocktails were the following (in g per dm^3); protein 1.4-2.4, carbohydrate 36-110, glucose 8-23, fructose 9-36, vitamin C 0.11-0.58 and Beta-carotene 0.12-0.30. The highest value of total pectin was measured in the celery and carrot cocktails (12.6 and 8.9 g per dm^3, resp.). Mineral contents of the cocktails varied as follows A(g per dm^3): Mg++ 0.05-0.12, Ca++ 0.12-0.34, K+ 1.53-3.22, Fe++ 0.001-0.008. The lowest ratio of Ca-Mg was found in the red beet and tomato cocktails (1.12 and 1.57, respectively). AS

Wines

2082 Chow (H) and Gump (BH). Phosphorus in wine: Comparison of atomic absorption spectrometry methods. **Journal of the Association of Offi-**

cial Analytical Chemists 70(1); 1987; 61-63

Phosphorus in wine may be determined directly or indirectly by atomic absorption spectrometry. The direct method uses the carbon rod atomizer as the excitation source and a phosphorus hollow cathode lamp. In the indirect detn., one measures the amount of molybdenum that will complex with phosphorus in the wine. Both nitrous oxide-acetylene and air-acetylene flames are suitable as atomization sources in this indirect method. The resultant data have been compared with those from the AOAC colorimetric method (11.032-11.034). A 2-sample comparison test showed the results to be insignificantly different at the 95% confidence limits. AS

Non-alcoholic beverages

Cocoa

2083 Bjerg (B), Roger Fenwick (GR), Spinks (A) and Sorensen (H). Failure to detect glucosinolates in cocoa. **Phytochemistry** 26(2); 1987; 567-568

Cocoa beans

2084 Malini (E), Puranaik (J), Shivashankar (S) and Nambudiri (ES). Physical and chemical composition of Indian cocoa (**Theobroma cocoa** L.) beans. **Journal of Food Science and Technology, India** 24(2); 1987; 96-97

Cocoa (**Theobroma cocoa** L.) beans procured from Kottayam, (Kerala state), Puttur and Sakaleshpur (Karnataka state) and Chundale (Tamilnadu state) were analysed for physical and chemical composition. The variations observed being wt./bean, 0.78-0.89 g, violet beans, 0.24%, salty beans 0.5%, insect damaged and fungus attacked beans, 0-20%, whitish beans 0-42%, rejects, 0-32.5%, nibs 82.7-85.9%, and shell 14.1-15.2%. The range in chemical composition are: moisture, 4.33-6.10%, total ash, 2.97-3.21, water insoluble ash, 1.48-1.91%, alkalinity of water soluble ash (as potassium peroxide), 0.33-0.59%, pH of nibs, 4.93-5.37, titrable acidity 2.17-2.88, volatile acidity 0.92-1.16, total sugars, 0.75-1.00%, lactic acid, 0.27-0.64%, citric acid 0.56-0.88%, tannins 2.05-3.00%, theobromine, 1.32-2.04% and fat 48.30-52.63%. KAR

Fruit juices

2085 Scott (VN) and Bernard (DT). Heat resistance of **Talaromyces flavus** and **Neosartorya fischeri** isolated from commercial fruit juices. **Journal of Food Protection** 50(1); 1987; 18-20

Tomato juices

2086 Kulwal (LV), Patwardhan (MV) and Sulladmath (UV). Studies on chemical characteristics and nitrate nitrogen content of a few cultivars of tomato in relation to tin pick up by canned juice. **Journal of Food Science and Technology, India** 24(2); 1987; 63-66

Nine tomato cv. ((i) Pusa Ruby, (ii) Sioux, (iii) Ogasta, (iv) Gemed, (v) Punjab Chhuhara, (vi) NMR, (vii) Punjab kesari, (viii) Sanmerzano, and (ix) Roma were grown during May 1978, Sept. 1978 and Jan. 1980 in Mysore (India) and analysed for pH, acidity, ascorbic acid, total sugars, viscosity, alcohol insoluble solids, lycopene and nitrate N. Juices of (i)-(v) were canned in 1 lb jam plain cans having a coating of 1 lb/base box (E 100) and tin pick up studied during 90 days of storage. Cv differed widely in their content of ascorbic acid, acidity, total sugars, viscosity and lycopene content. Seasonal variation in chemical composition was also observed; slight increase in aciditiy, ascorbic acid, and decrease in sugars were observed in Sept. harvests compared to Jan. harvests. Nitrate N content also varied with season from <0.4 to 1.00 p.p.m. Tin pick up by canned juice of different cv. at the end of 90 days storage at 37 C was 43 to 60 p.p.m. and the extent of feathering observed at the can interior was from very light to light. KAR

Squashes

Citrus squashes

2087 Ahmad (M), Choudhry (MA) and Khan (I). Studies on the quality evaluation of citrus and mango squashes. **Pakistan Journal of Science** 38(14); 1986; 25-38

FATS AND OILS

Fats

2088 Arens (M), Kroll (E) and Spannuth (D). Survey by a working party of the DGF, 97th report German Standard Methods for investigation of fats, fatty products and related materials, 74th report: Analysis of fat raw materials VIII. **Fette Seifen Anstrichmittel** 88(8); 1986; 293-294 (De).

2089 George (G), Ramesh (BS) and Sen (DP). Effect of interestrified fats and isolated trans fatty acids on serum lipid classes in cholesterol-bile salt stressed rats. **Fette Seifen Anstrichmittel** 88(8); 1986; 307-315 (De).

Interesterified fats having a plastic property were prepared from: (a) sal fat and groundnut oil (30:70 w/w, P/S 0.8); (b) vanaspati and groundnut oil (40:60; P/S 1.0; isolated trans-fatty-acid content (17%); (c) cottonseed oil (P/S 1.5), and (d) sal fat and safflower oil (50:50; P/S 1.3); sodium methoxide was used as the catalyst. Various properties of these fats have been reported in detail. When these test lipids were fed to animals, the fat and cholesterol contents of the livers were significantly lower than in the livers of animals fed vanaspati, especially when the linoleic acid content of the product was compartively low. The process of rearrangement appears to have reduced the cholesterol content of the liver. The hypolipidaemic effect of the interesterified products was similar to that of the original materials. Isolated trans-fatty-acids behaved more or less like a saturated fattyacid in elevating serum lipids. Vanaspati was found to be highly hyperlipidaemic. KMD

Groundnut butter

2090 Ram (BP), Hart (LP), Cole (RJ) and Pestka (JJ). Application of ELISA to retail survey of aflatoxin B1 in peanut butter. **Journal of Food Protection** 49(10); 1986; 792-795

A simple procedure was devised for the routine screening of aflatoxin B1 (AFB1) in peanut butter using enzyme-linked immunosorbent assay (ELISA). Peanut butter samples (5 g) were artifically contaminated with AFB1 and extracted by blending with 25 ml of 55% methanol and 10 ml of hexane. The extract was filtered and aqueous filtrate analyzed by a direct competitive ELISA. Recovery of AFB1 added to peanut butter samples ranged from 85 to 112%, with an average inter-well coefficient of variation of 18.4%. The inner-assay coefficient of variation was 22.7%. Using this procedure, only 3 of 63 commercial samples of peanut butter had detectable levels (> 5.0 μg/kg) of AFB1. AS

Oils

2091 Murthi (TN), Sharma (M), Devdhara (VD), Chatterjee (S) and Chakraborty (BK). Storage stability of edible oils and their blends. **Journal of Food Science and Technology, India** 24(2); 1987; 84-87

Shelf life, free fatty acid (FFA) content and peroxide value (PV)) of vegetable oil blends containing 25% raw edible oil (mustard oil, sesame oil, groundnut oil, and coconut oil) and 75% each of refined rapeseed oil, cottonseed oil, palm oil and palmolein was investigated at 30-day intervals during 150 days storage at 37 C in an incubator and compared with the changes in individual raw edible oils. Refined oils initially contained low FFA (0.04 to 0.16%) than the raw oils (0.33 to 0.70%). The initial PV of raw oils ranged from 2.7 to 17.8 m.eq/kg. The max. FFA in edible oil blends at the initial stage was 0.33% and had a higher moisture content of 0.13% to 0.15% than the refined oils. During storage the FFA in edible oils increased more than in refined oils. Oil blends showed a lower increase in FFA than their ingredients. Among the blends sesame oil or groundnut oil blended with refined cottonseed oil showed the least increase in FFA. PV of raw edible oils and their blends tended to rise steadily to a max. declining gradually thereafter. After 120 days the acceptability for raw edible oils became poor when the PV was between 5.9 and 16 m.eq/kg and for the refined oils it happened after 90 days (PV was 4.4 and 9) and for the blends after 90-120 days (PV 4-45). The consumer preference in various areas was for oil blends containing cottonseed oil with sesame oil or groundnut oil, coconut oil with palmolein and rapeseed oil with mustard oil. Blends containing palm oil were less acceptable as a waxy solid mass separates out in these oils. KAR

Groundnut oils

2092 Usha Bajwa (Bains (GS). Studies on the glycerolysis of groundnut oil and cottonseed oil. **Journal of Food Science and Technology, India** 24(2); 1987; 81-83

Groundnut oil and cottonseed oil were glycerolysed at 180 and 190 C in the presence of 4, 8 and 12% levels of glycerine using sodium carbonate as catalyst. The amount of Alpha-monoglycerides was lower when glycerolysis was done at lower temp. (range 7-9.5% in groundnut oil and 1.4-1.8% in cottonseed oil) than at higher temp. (range 10.4-25.3% for groundnut oil and 5.9-7.3% for cottonseed oil). Higher amount of alpha-monoglycerides were found in the presence of higher glycerine. Melting point of glycerolysed groundnut oil was higher (35 C) than that of glycerolysed cotton seed oil. The viscosity of the glycerolysed groundnut oil was considerably higher than that of glycerolysed cottonseed oil. The viscosity of both the oil increased with increase in degree of glycerolysis. The glycerolysed products exhibited flow behaviour of Newtonian liquids. KAR

Palm oils

2093 Timms (RE). Processing of palm kernel oil. **Fette Seifen Anstrichmittel** 88(8); 1986; 294-300

By the end of the century palm kernel(PK) oil is forecast to rank fifth in volume of world trade in oils, only slightly behind coconut oil. PK oil received by Malaysian refiners is of good quality, typically below 2% in free fatty acids, and is easily refined. PK oil is fractionated to give a higher melting fraction (stearin) and a lower melting fraction (olein). The various processes used are described. PK oil, olein or stearin are also hydrogenated to give a range of products ranging in melting point from about 24 to 44 C. PK oil and olein are interesterified alone or in blends with a non-lauric oil to give products with improved melting properties and utility. The utilisation of PK oil in the main application areas of confectionery fats, non-dairy/imitation dairy products, biscuit creams, industrial margarines, nut roasting and spray oils are discussed. AS

Soybean oils

2094 Ong (TL). Influence of cessation of lye-neutralisation on the hydrogenation process of soybean oil. **Fette Seifen Anstrichmittel** 88(8); 1986; 302-307 (De).

A greater number of soybean oils of standard quality have been hydrogenated with or without previously neutralisation. The cessation of the lye-neutralisation has a negative influence on the hydrogenation velcoity and the linoleic acid selectivity. AS

SPICES AND CONDIMENTS

Spices

2095 Heath (H). When the salt has lost its savour. **Food** 9(2); 1987; 16, 17, 19, 21

Reviews developments in the savoury flavours in view of the current 'health' trend. Aspects included are meat and meat flavours (meat extracts; protein hydrolysates, process flavours yeast extracts and autolysed yeast); onion and garlic extracts; tomato products; seasonings (encapsulated spices spice emulsions, and carbon dioxide extracted spice oils)and dairy products (enzyme modified cheese). BV

2096 Rogers (JH) and Guarino (PS). Comparison of antibiotic-containing media and media supplement with dichloran and Rose Bengal for isolation and enumeration of fungi in spices. **Journal of Food Protection** 49(10); 1986; 815-817

Yeast and mold counts of various spice products were determined using Dichloran Rose Bengal agar, Phytone Yeast Extract agar with added Dichloran and Rose Bengal, and Antibiotic Plate Count agar. Media containing the added Dichloran and Rose Bengal proved superior to media without Dichloran and Rose Bengal in controlling mold overgrowth, and promoting distinct colony morphology. Results were obtained 2 days earlier using Phytone Yeast Extract agar with added Dichloran and Rose Bengal. AS

Chillies

2097 Shivhare (US), Maharaj Narain Agrawal (US), Saxena (RP), Singh (BPN). Some physico-mechanical properties of chillies. **Journal of Food Science and Technology, India** 24(2); 1987; 98-99

Physico-chemical properties (which are important in the systematic design of transport, handling, packaging and storage systems,) of fresh and dried chillies (capsicum) and shearing strength of dried chillies were determined. The bulk density, true density and bed porosity values for fresh harvested sound chillies (moisture content 75% wet basis) were 0.37 g/ml, 0.84 g/ml and 56.0%, resp. whereas these values for dried chillies were 0.13 g/ml, 0.58-0.62 g/ml, and 77.6-79.0% resp. The energy needed to shear the dried chillies at different impact loads ranged from 0.052 to 0.199 J. KAR

Garlic

2098 Graham (HD) and Graham (EJF). Inhibition of **Aspergillus parasiticus** growth and toxin production by garlic. **Journal of Food Safety** 8(2); 1987; 101-108

Mycelial growth and toxin production by **Aspergillus parasiticus** were inhibited by garlic concn. of 0.3-0.4%. When the fungus was grown in broth, aflatoxin B1 production was inhibited at a garlic concn. of 0.3% while aflatoxin G1 production was inhibited by 0.25% garlic. When growth on rice, aflatoxin B1 was detected at garlic concn. of up to 2.5%. Aflatoxin G1 was detected at 1.25% garlic concn. but not above this level. AS

Paprika

2099 Borszeki (J), Kepes (J), Koltay (L) and Sarudi (I). Classification of paprika quality using pattern recognition methods based on elemental composition. **Acta Alimentaria** 15(2); 1986; 93-100

Twenty-three paprika samples of different quality, according to the definition of the Hungarian standard (1983) grown in the same year and at the same geographical location, were analysed on the basis of their ash contents and the elemental composition of the ash. The aim of the examinations was to determine whether the samples could be classified according to quality on the basis of the characters tested. The Fe, Ca, K and Mg contents of the ash samples prepared from paprika plants were determined with a Zeiss AAS atomic absorption spectrometer, the P content spectorphotometrically, and the Si, Pb, Mn, Al, Ni, Cu, B and Ti contents by means of optical emission spectral analysis. After processing the data with an EMG-666 table-top computer using the Karhunen-loeve transformation, the Fisher wt. and the K-nearest neighbour pattern recognition methods, it was found that the samples could be efficiently classified according to the paprika species. AS

Pepper

2100 Lupina (T) and Cripps (H). UV spectrophotometric determination of piperine in pepper preparations: Collaborative study. **Journal of the Association of Official Analytical Chemists** 70(1); 1987; 112-113

Eight collaborating laboratories performed replicate analyses for piperine on 5 samples representing pepper raw spice, oleoresins, and soluble seasonings. Piperine is extracted into ethylene dichloride and measured at maximal absorbance 342-345 nm with a UV light source. Piperine content is calculated using an absorbance factor derived from piperine. Intralaboratory coefficients of variation (CV_o) ranged from 0.5 to 3.1%; interlaboratory coeff. of variation (CV_x) ranged from 3.0 to 5.8%. The method has been adopted as an official method of the American Spice Trade Association and as an official first action method by AOAC. AS

SENSORY EVALUATION

2101 Bagley (EB) and Christianson (DD). Measurement and interpretation of rheological properties of foods. **Food Technology** 41(3); 1987; 96-99

2102 Boudreau (JC). Neurophysiology and human taste sensations. **Journal of Sensory Studies** 1(3/4); 1986; 185-202

Article discuss other than different taste sensations including those of salty, sour, sweet, bitter, umami and metallic. KAR

2103 Boyar (MM) and Kilcast (D). Food texture and dental science. **Journal of Texture Studies** 17(3); 1986; 221-252

The techniques used in dentistry which enable the monitoring of mastication include gnathosonics, electromyography, cinematography and the use of various electronic, intra-oral instruments. The forces involved during the masticatory cycle have been estimated using a variety of both extra- and intra-oral devices. The possible implications of this knowledge are discussed in relation to obtaining greater information from instrumental techniques, developing more meaningful mechanical test methods, improving methodology used in the establishment of texture panels and in acquiring a greater understanding of results obtained from such sensory evaluations. AS

2104 Civille (GV) and Lawless (HT). The importance of language in describing perceptions. **Journal of Sensory Studies** 1(3/4); 1986; 203-215

2105 Colwill (JS). Sensory analysis by consumer. Part 2. **Food Manufacture** 62(2); 1987; 53, 55

Briefly discusses some of the methods for collecting data from consumers on the acceptability and preferences of products, how this information can be related to trained panel data, and methods for using consumer data to develop and/or optimise food products. BV

2106 Findlay (CJ), Gullett (EA) and Genner (D). Integrated computerised sensory analysis. **Journal of Sensory Studies** 1(3/4); 1986; 307-314

A computerized sensory analysis system, based on an IBM-PC compatible local area network, was developed. Panelist input was simplified through the use of a light pen and interactive questionnaire program. The system was integrated to allow preparation of descriptive, hedonic, triangle, structured and unstructured ballots; registration of panelists; collection of data; statistical analysis and report generation. The primary benefits are the simplicity of response for panelists, flexibility for the sensory analyst to design questionnaires and the elimination of time-consuming manual scoring and data manipulation involved in conventional sensory analysis. AS

2107 Lin (T-T) and Pitt (RE). Rheology of apple and potato tissue as affected by cell turgor pressure. **Journal of Texture Studies** 17(3); 1986; 291-313

Experiments were performed on two var. of apple tissue and one var. of potato tissue, in which cell turgor pressure was varied and the concomitant mechanical properties of the tissue were tested. Turgor pressure was controlled by immersion in solutions of various mannitol concn., and the degree of swelling or contraction of the tissue samples was measured. Under constant-strain-rate loading, mode of failure varied among the different commodities, and underwent a transition as the turgor pressure was varied. Rate of loading also caused a transition in failure mode. The stress and strain at failure and tissue stiffness were related to mode of failure, turgor pressure, and strain rate. From the osmotic swelling data, estimates were made of the cell wall stress-strain behaviour and of the probability distribution for cell-wall strength in Ida Red apple tissue. AS

2108 Mattes (RD). Effects of health disorders and poor nutritional status on gustatory function. **Journal of Sensory Studies** 1(3/4); 1986; 275-290

The review covers various aspects like the problem of normal variability in taste response, methodological considerations, gustatory complications, health and nutritional factors influencing gustatory function, receptor accessibility, receptor status and neural transport and processing. KAR

2109 Olthoff (LW), Van der Bilt (A), De Boer (A) and Bosman (F). Comparison of force-deformation characteristics of artificial and several natural foods for chewing experiments. **Journal of Texture Studies** 17(3); 1986; 275-289

The masticatory performance of an individual has been quantified by determining the particle sizes of the comminuted food. Optosil, a silicon rubber, has been used as an artificial test food in clinical studies, because it has reproducible textural properties. A comparison between Optosil and several natural foods was made by measuring textural properties of Optosil, turnip, carrot, Gouda cheese and peanut. Several types of probes were used to imitate the cusp form of the teeth. Force-deformation plots revealed similar max. firmness for Optosil, turnip and carrot, whereas peanut showed a larger firmness. The force needed to crush Optosil is much larger than for the natural foods, but it is well within the physiological range of healthy subjects. The reproducibility of the textural properties is better for Optosil than for the natural foods. The particle size distribution of Optosil broken by a testing machine was compared with the results obtained during chewing. AS

2110 Purkayastha (S) and Peleg (M). Comparison between projected mechanical equilibrium conditions of selected food materials in stress relaxation and creep. **Journal of Texture Studies** 17(4); 1987; 433-444

Asymptotic modulus versus strain relationships in stress relaxation tests of potato flesh, Cheddar cheese and 1.5% agar gels were compared to similar relationships derived from creep experiment. The asymptotic moduli (or compliance reciprocals) were on the same order of magnitude and their dependency on the strain of a similar character. These suggest that despite the history sensitive response of food materials, their mechanical equilibrium conditions are governed by the same structural features. AS

2111 Rao (MA). Predicting the flow properties of food suspensions of plant origin. **Food Technology** 41(3); 1987; 85-88

Rheological models for plant food suspensions (PFS), rheological behaviour of nonfood suspensions, characteristics of PFS, and modeling the apparent visocosity of PFS are some of the aspects covered. KAR

2112 Shoemaker (CF), Lewis (JI) and Tamura (MS). Instrumentation for rheological measurements of food. **Food Technology** 41(3); 1987; 80-84

The developments made in the rheometer design and their applications have been covered. Steady-shear rheometry and controlled-stress rheometry are discussed at length. KAR

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

2113 Daniel Cline (L) and Highland (HA). Survival of four species of stored-product insects confined with food in vacuumized and unvacuumized film pouches. **Journal of Economic Entomology 80(1); 1987; 73-76**

Survival of live insects accidentally packaged with military rations in vacuumized and unvacuumized airtight flexible food pouches was determined for adults and larvae of **Cadra cautella** (Walker), **Lasioderma serricorne** (F.), **Tribolium castaneum** (Herbst), and **Trogoderma variable** Ballion. Seven foods and four types of pouches were tested, each food was packed in a specific type of pouch. Some **C. cautella** and **T. castaneum** were found alive in various unvacuumized pouches after 3 wk of confinement. Most were dead after 6 wk. **T. variabile** and **L. Serricorne** survived in some pouches for the duration of the tests (12 wk). **L. serricorne** penetrated some of the pouches and escaped. Only **L. serricorne** survived for 1 wk in pouches vacuum-sealed with a vacuum of 46.8 mm Hg; all were dead at 3 wk. Some pouches with a minimal vaccum (533.0 mm Hg) allowed survival of **T. variable** and **L. serricorne** for 12 wk. Progeny from adults or insects from tests started with larvae were usually smaller and less developed than those in the controls that had an unlimited supply of air. AS

Infestation control

2114 Titon (EW) and Brower (JH). Ionizing radiation for insect control in grain and grain products. **Cereal Foods World 32(4); 1987; 330-335**

A technical review article which includes aspects like effect of radiation on insects, types of irradiaters, dosimetry, radio sensitivity of stored-product pests, selection of radiation disc, effects of combined treatment with radiation, sublethal radiation for controlling insects in bulk grain, feeding by irradiated insects, susceptibility of insecticide-resistant insects to radiation, possible resistance to radiation and removing insects from irradiated grain. KAR

Pesticides

Cypermethrin

2115 Tyler (JFC). Gas chromatographic method for determination of cypermethrin in pesticide formulations: Collaborative study. **Journal of the Association of Official Analytical Chemists 70(1); 1987; 51-53**

A gas chromatographic method for detn. of total cypermethrin in technical and formulated products has been developed and subjected to a collaborative study involving 15 participating laboratories. Each sample was dissolved in methyl isobutyl ketone containing di(2-ethylhexyl)phthalate as internal standard and analyzed by GC on a glass column with 3% OV-101 on Chromosorb W-HP. Each collaborator was furnished with reference standard and 4 samples of technical material, 3 emulsifiable conc. one wettable powder, and one ultralow volume formulation for analysis. The coeff. of variation of the results obtained ranged from 0.955 to 1.7462%. The method has been adopted as official first action by AOAC. AS

Insecticides

Pyrethroids

2116 Subramanyam (B) and Cutkomp (LK). Influence of posttreatment temperature on toxicity of pyrethroids to five species of stored-product insects. **Journal of Economic Entomology** 80(1); 1987; 9-13

The influence of 20 and 30 C on the toxicity of pyrethroids to confused flour beetle (**Tribolium confusum**), lesser grain borer, (**Rhyzopertha dominica**), larger grain borer (**Prostephanus truncatus**) Indian meal moth (**Plodia interpunctella**) and almond moth (**Cadra cautella**). The results indicate that cyfluthrin was associated with a negative temp. coeff. for confused flour beetle, larger grain borer, Indian meal moth and almond moth. Biaallethrin was associated with a negative temp. coefficient for lesser grain borer and Indian meal moth, However, d-phenothrin was associated with a positive temp. coeff. for confused flour beetle and was the most toxic of the pyrethroids. KAR

Permethrin

2117 Tyler (JFC). Gas chromatographic method for determination of permethrin in pesticide formulations: Collaborative study. **Journal of the Association of Official Analytical Chemists** 70(1); 1987; 53-55

A gas chromatographic method for detn. of permethrin in technical and formulated products has been developed and subjected to a collaborative study involving 19 participating laboratories. Each sample was dissolved in methyl isobutyl ketone containing n-octacosane as internal standard and analyzed by gas chromatography on a glass column with 3% OV-210 on Chromosorb W-HP. Each collaborator was furnished with reference standard and 5 samples of technical material (90-95%), 8 emulsifiable conc. (10-50%), 2 wettable powders(20-30%), one dustable powder(1-2%), and one water-dispersible granules (1-2%) for analysis. The coeff. of variation of the results obtained ranged from 0.79 to 4.24%. The method has been adopted as official first action by AOAC. AS

BIOCHEMISTRY AND NUTRITION

Biochemistry

2118 Hazell (T) and Johnson (IT). In vitro estimation of iron availability from a range of plant foods: Influence of phytate, ascorbate and citrate. **British Journal of Nutrition** 57(2); 1987; 223-233

2119 Reiser (S). Metabolic effects of dietary pectins related to human health. **Food Technology** 41(2); 1987; 91-99

Effect of pectin on blood lipids and glucose tolerance, and pectin on mineral and vitamin bioavailability, are the aspects covered. 78 references. KAR

2120 Tachiki (T), Suzuki (H), Wakisaka (S), Yano (T) and Tochikura (T). Production of Gamma-glutamylmethylamide and Gamma-glutamylethylamide by coupling of baker's yeast preparations and bacterial glutamine synthetase. **Journal of General and Applied Microbiology** 32(6); 1986; 545-548

The production Gamma-glutamylmethylamide (Gamma-GMA) and Gamma-glutamylethylamide (theamine) depending on the reactivity toward methylamine and ethylamine of glutamine synthetase of **Micrococcus glutamicus** is described. MVG

2121 Tiwari (KK) and Verma (RM). Titrimetric microdetermination of some sulphur-containing amino acids. **Journal of the Indian Chemical Society** 63(11); 1986; 1008-1009

An oxidimetric micromethod has been proposed for the detn. of reduced glutothine (GSH), cystine, and methionine . It consists in titrating the sample solution with a standard potassium iodate solution in 4-6 M hydrochloric acid medium, in the presence of carbon tetrachloride. Phenolphthalein is used as the indicator. The method is rapid, simple, and accurate. KMD

2122 Watanabe (T), Abe (H), Kido (K) and Ikeda (M). Relationship of cadmium levels among blood, urine, and diet in a general population. **Bulletin of Environmental Contamination and Toxicology** 38(2); 1987; 196-202

Nutrition

2123 Leonard (TK), Mohs (ME), Ho (EE) and Watson (RR). Nutrient intakes: Cancer causation and prevention. **Progress in Food and Nutrition Science** 10(34); 1986; 237-277

TOXICOLOGY

2124 Gunnison (AF) and Jacobsen (DW). Sulphite hypersensitivity. A critical review. **CRC Critical Reviews in Toxicology** 17(3); 1987; 185-214

Sulphite hypersensitivity is reviewed comprehensively. Aspects covered include chemical properties of sulphites; human exposure to sulphites (Foods and beverages); sulphite hypersensitivity (definition; response to ingested sulphite, etc.) sulphur dioxide sensitivity; mechanisms of sulphite hypersensitivity; route and mode of exposure in sulphite hypersensitivity testing; metabolism of sulphite and predisposing factors in sulphite hypersensitivity. BV

2125 Riviere (JE), Craigmill (AL) and Sundlof (SF). Food animal residue avoidance databank (FARAD): An automated pharmacologic databank for drug and chemical residue avoidance. **Journal of Food Protection** 49(10); 1986; 826-830

Bacteria

Bacillus cereus

2126 Kamat (AS), Nene (SP), Nerkar (DP) and Nadkarni (GB). The nature of toxins produced by **Bacillus cereus** Bis-59. **Journal of Food Safety** 8(2); 1987; 71-81

Eight strains of **Bacillus** spp. were examined for production of toxin(s). Three strains of **Bacillus cereus** produced toxins lethal to mice. The culture filtrate of **Bacillus cereus** BIS-59 contained two lethal toxins. One was a hemolysin and the other a nonhemolytic glycoprotein. The growth of cells in fresh beef infusion broth resulted in high toxin production, compared to growth in tryptone-glucose-yeast extract or nutrient broth. Separate identities for the two toxins from **B. cereus** BIS-59 were established on the basis of hemolytic activity, separation profiles on Sephadex gel filtration, responses to heat and radiation and kinetics of their production during the growth of the organism. AS

Salmonella

2127 Chander (R) and Lewis (NF). Lipopolysaccharide-protein complex as potent vaccine against Salmonellosis. **Journal of Food Safety** 8(2); 1987; 89-99

Lipopolysaccharide-protein (LPS-P) vaccine prepared from cells of **S. typhimurium** contains 11% protein. Immunization mice with LPS-P intraperitoneally at a dose level of 50 μg/mouse conferred 100% protection against subsequent challenge with **S. typhimurium** and seven other strains of **Salmonella** each possessing typical O-antigen determinants. The immunity lasts for six months and the vaccine is equally effective in all six strains of mice studied. The lyophilized LPS-P preparation is stable for eighteen months, thus providing opportunity for large scale field trial experiments. AS

Staphylococcus

2128 Smith (JL), Bencivengo (MM), Buchanan (RL) and Kunsch (CA). Effect of glucose analogs on the synthesis of staphylococcal enterotoxin A. **Journal of Food Safety** 8(2); 1987; 139-146

Glucose, 2-deoxyglucose (2-DOG), and Alpha-methylglucose (Alpha-MG) inhibited staphylococcal enteratoxin A (SEA) synthesis by **Staphylococus aureus** 196E whereas Beta-methylglucose (Beta-MG) and 3-O-methylglucose (3-O-MG) did not inhibit even at high concn. Glucose (at levels not inhibitory to SEA synthesis) potentiated the inhibition of toxin synthesis by 2-DOG and Beta-MG and the glucose analog combinations had a decreased pH. KAR

Mycotoxins

Aflatoxins

2129 Buchanan (RL), Wiseman (DW), Ocker (LA), Stahl (HG), Kunsch (CA) and Purcell (CJJr). The effects of Beta-methylglucose, 3-O-methylglucose and thioglucose on aflatoxin production by **Aspergillus parasiticus**. **Journal of Food Safety** 8(2); 1987; 127-138

As sole carbon source of conidia-initiated cultures, Beta-methylglucose (BMG), and 3-O-methylglucose (3MG) and thioglucose (TG), supported growth, but none supported toxin production. In glucose-containing replacement cultures, MG appeared to stimulate toxin production, while TG was inhibitory and 3MG had no effect. KAR

Aflatoxins

2130 Obioha (WI), Stahr (HM) and Kraft (AA). Distribution and effects of aflatoxin in chicken tissues after feeding radiolabeled (^{14}C) aflatoxin B1. **Journal of Food Protection** 49(10); 1986; 799-805

Cyclopiazonic acid

2131 Trucksess (MW), Mislivec (PB), Young (K), Bruce (VR) and Page (SW). Cyclopiazonic acid production by cultures of **Aspergillus** and **Penicillium** species isolated from dried beans, corn meal, macaroni, and pecans. **Journal of the Association of Official Analytical Chemists** 70(1); 1987; 123-126

Ninety-five isolates of **Aspergillus** and **Penicillium** sp. from selected dried foods were examined for their ability to produce cyclopiazonic acid (CPA). The isolates were grown in sterile synthetic liquid medium at 28 C for 8 days in the dark. The medium and mold mycelia were then extracted with chloroform. CPA was semiquantitatively determined by thin layer chromatography through visual comparison with standards. The cultures of **A. flavus** were also examined for their ability to produce aflatoxin. One **A. tamarii** and all 13 **P. urticae** isolates produced CPA, whereas only 19 of the 31 (61%) **A. flavus** isolates produced CPA, and 6 (19%) **A. flavus** produced aflatoxin. All 113 **P. urticae** isolates also produced patulin and griseofulvin. CPA-producing **A. flavus** was found in all food types but not in all samples. CPA-producing **P. urticae** was found only in dried beans and macaroni. AS

Pesticide residues

2132 Sastry (CSP), Vijaya (D) and Mangala (DS). Spectrophotometric determination of carbaryl and propoxur using aminophenols and phenylenediamine. **Analyst** 112(1); 1987; 75-78

Three spectrophotometric methods are described for the detn. of carbaryl and propoxur in insecticidal formulations, water and grains, based on the formation of coloured species with p-aminophenol, p-N,N-dimethylphenylenediamine dihydrochloride and 1-amino-2-naphthol-4-sulphonic acid, respectively under specified experimental conditions. Al the methods are simple, sensitive and accurate to within plus or minus 1.0%. AS

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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm, cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal, kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg, ml, mm)
m-equiv	milli-equivalent
$\mathfrak{m}$	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano- (10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc. normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp., spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro- (as in µg, µm)
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

GENERAL

2133 Pearce (SJ). Quality assurance involvement in new product design. **IFST Proceedings** 41(4); 1987; 104-109

The importance of design assurance in food product development and commercialization to minimise new product failures, consumer complaints, and the cost of redesign to correct the problems have been discussed. KAR

FOOD PROCESSING

2134 Kormendy (I). Outline of a system for the selection of the optimum sterilization process for canned foods. **Acta Alimentaria** 16(1); 1987; 3-27

A system is presented for the selection of the best sterilization process from a finite number of process variations. The system has been planned for application to canned foods in industrial practice. Some new calculation methods for the detn. of temp. and property fields within the processed food material are also described. Adequate computer programmes have been developed for practical use. The following fields are treated in detail: The transfer of heat in the food material solely by conduction. The transfer of heat dominantly by strong natural convection. Some new methods are also included for the calculation of property changes. These enable a wide range of other than first order variations to be calculated. The concept of "slowest heating point" is also revised and substituted by a more exact term. AS

2135 Krone (CA) and Iwaoka (WT). Commercial food processing operations and mutagen formation. **Journal of Food Protection** 50(2); 1987; 167-174

2136 Skala (JH), McGown (EL) and Waring (PP). Wholesomeness of irradiated foods. **Journal of Food Protection** 50(2); 1987; 150-160

2137 Wilkinson (V). Update of irradiation. **Food Manufacture** 62(3); 1987; 67-68

Food irradiation as a method of processing food is increasing. This paper outlines its role in reduction of microorganisms and of particular interest to the baking and confectionery industries in its use to control insect infestation and microorganisms. BV

FOOD PACKAGING

2138 Rudolph (FB). Prediction of shelf. life of packaged water-sensitive foods. **Lebensmittel-Wissenschaft und-Technologie** 20(1); 1987; 19-21

A new method based on Heiss differential mass balance has been developed to determine the shelf life or to optimise the packaging of packed water sensitive food. It enables production plants to select the optimum packaging in a simple way without determining the ERH curves directly. It is also possible to check, by a simple experiment, whether the conditions to be met are fulfilled. BV

Canning

2139 Ramakrishnan (TV), Laperle (EA) and Hayes (KM). Comparison of steam canned processing with other methods of home canning. **Journal of Food Processing and Preservation** 11(1); 1987; 43-61

The experiment conducted with tomato juice, tomatoes and apple sauce indicated that steam canner method may be more efficient than other methods like boiling water bath and pressure canner at 5 and 10 lb pressure for home canning of acid products. KAR

Retortable pouches

2140 Bhowmik (SR) and Tandon (S). A method for thermal process evaluation of conduction heated foods in retortable pouches. **Journal of Food Science** 52(1); 1987; 202-209

A mathematical model using a finite difference techniques for any time variable retort temp. profile has been developed and verified experimentally for evaluating thermal processing of conduction heated foods in retortable pouches. This model is capable of determining various parameters and results of thiamin assay in pea puree processed in these pouches tallied between experimental and model predicted valves for thiamin retention. NGKR

FOOD ENGINEERING AND EQUIPMENT

2141 Bera (F), Deltour (J) and Deroanne (C). Measure of the relative importance of conduction and convection in the canned food heat process. **Lebensmittel-Wissenschaft und-Technologie** 20(1); 1987; 1-7 (Fr).

Thermal diffusivity characterizes the transfer of heat by conduction only in homogeneous and isotropic solids. The concept of equivalent thermal diffusivity allows the study of convection by analogy with conduction and an assessment of their relative importance to be made. This new parameter is calculated by replacing, at each moment, the real sample by an ideal solid which will have the same central temp. under the same limiting conditions. The behaviour of this parameter provides conclusive evidence for the existence of convective flowing foods during sterilization. AS

2142 Campanella (OH) and Peleg (M). Determination of the yield stress of semi-liquid foods from squeezing flow data. **Journal of Food Science** 52(1); 1987; 214-215

The possibility of yield stress detn. by squeezing flow and to compare the results with those obtained in shear flow measured by coaxial viscometers. The results showed that the yield stress of tomato paste, ketchup mustard and mayonnaise were virtually independent of the force imposed and the initial thickness of the samples. When these values are compared with those obtained by coaxial viscometry and were in agreement with values determined by squeezing flow method which is a feasible and convenient method in the foods tested and may be useful for testing other similar products. NGKR

2143 Safon (J) and Rodrigo (M). An on-line system for data aquisition, transmission and processing for thermal treatment studies in foods. **Revista de Agroquimica y Tecnologia de Alimentos** 27(1); 1987; 79-88 (Es).

A system developed in this laboratory for data acquisition, transmission and processing during thermal treatment in foods is described. The system has been applied to calculate lethality values in foods from time-temp. data. The system can be used to calculate simultaneously the inactivation of enzymes and the degradation of quality sensory factors in the food sample. AS

ENERGY IN FOOD PROCESSING

2144 Anon. Busch makes fuel from waste; Optimizes energy use via distributed process control. **Brewers" Digest** 62(3); 1987; 34

To maximize energy savings, Busch have installed a distributed process control system, the DCI system, to monitor and control the volume and velocity of its methane gas by-product and to get substantial savings in operating costs. BV

FOOD CHEMISTRY AND ANALYSIS

Chemistry (Analytical)

2145 Anon. Automatic detection of foreign matter in food. **British Food Journal** 89(938); 1987; 52-53

Highlights the problems of detecting foreign objects in food, particularly pre-packed, and processed foods with emphasis on methods of overcoming them. BV

2146 Heikes (DL). Purge and trap method for determination of volatile halocarbons and carbon disulphide ion table-ready foods. **Journal of the Association of Official Analytical Chemists** 70(2); 1987; 215-226

A modified method for the detn. of ethylene dibromide in table ready foods has been described. MVG

2147 McHan (F) and Horvat (RJ). A gas-liquid chromatographic method for analysis of pyruvic acid and lower molecular weight fatty acids in plant materials. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 241-243

A gas-liquid chromatography (GLC) method has been developed for quantitative analysis of pyruvic acid and lower mol. wt. fatty acids in plant materials. Plant extracts containing pyruvic acid and other low mol. wt. fatty acids were treated with sodium borohydride, converting the pyruvic acid to lactic acid. Heating in butanol saturated with dihydrogen chloride subsequently converted the acid components into the corresponding butyl esters, which were analyzed by GLC. GLC-mass spectrometry was used to confirm the identity of the GLC peaks. The efficiency of recovery of added pyruvic acid from Coastal Bermuda grass silage was 94%. Analyses were carried out on onion, apple, banana, and wheat kernels. AS

2148 Watkins (KL), Veum (TL) and Krause (GF). Total nitrogen determination of various sample types: A comparison of the Hach, Kjeltec, and Kjeldahl methods. Journal of the Association of Official Analytical **Chemists** 70(3); 1987; 410-412

Hach and Kjeltec methods of Nitrogen analysis are compared with Kjeldahl method. Each of the method was used to analyse N sources and run 5 times each to provide for repeatability. The mean N content over all 20- samples was higher with Kjeldahl analysis ($P < 0.05$) than with Kjeltec, while Hach produced intermediate results. Results also indicated that Hach producer had the greatest ability to detect differences in N content among samples, being more sensitive than the other two methods ($P < 0.05$). MVG

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

Glucoamylases

2149 Acabal (AD) and del Rosario (EJ). Effects of pH on glucoamylases production by **Aspergillus awamori** NRRL 3112 in an airlift fermenter. **Annals of Tropical Research** 8(4); 1986; 157-163

The effects of pH on batch production of glucoamylase by **Aspergillus awamori** NRRL 3112 in a 3.5-L airlift fermenter were determined using a mixture of cassava flour and rice bran (1:2 wt. ratio) as substrate. Highest production of the enzyme was noted on the fourth day of incubation when the pH of the medium was maintained at 5.5. The volumetric and specific activities of glucoamylase were 124.4 IU/mL and 10.3 IU/mg protein, resp. AS

Ethyl alcohol

2150 Godia (F), Casas (C) and Sola (C). A survey of continuous ethanol fermentation systems using immobilized cells. **Process Biochemistry** 22(2); 1987; 43-48

This paper reviews the literature on continuous fermentation with immobilized cells and surveys the different approaches used to maximise ethanol yields. Continuous ethanol fermentation by cells immobilized by adhesion to a surface, cells entrapped in polymeric matrices, cells retained behind membranes, continuous enthanol production with flocculating cells are the aspects covered. 100 references. BV

2151 Wayman (M), Seagrave (C) and Parekh (S). Ethanol fermentation by **Pichia stipitis** of combined pentose and hexose sugars from lignocellulosics prehydrolysed by sulphur dioxide and enzymatically saccharified. **Process Biochemistry** 22(2); 1987; 55-59

Lignocellulosic biomass, namely pine, aspen, and corn stover, were prehydrolysed using sulphur dioxide as the hydrolysing catalyst. The prehydrolysis residues were directly saccharified, without washing, by cellulolytic enzymes, whereby about 90% of theoretical yields of sugars were obtained. Fermentation of the hydrolysates containing both the hemicellulose and cellulose sugars by a pentose fermenting yeast, **Pichia stipitis** R gave yields of 372, 346 and 388 litres of ethanol per tonne (dry wt.) from pine, aspen and corn stover resp. The technical aspects of the sulphur dioxide catalysed prehydrolysis and enzymatic saccharification stages and the advantages of fermentation by pentose fermenting yeasts are discussed. AS

Fermentation

2152 Pecs (M), Szigeti (L), Boros (A), Nyeste (L), Hollo (J), Bathory (J), Pataky (I) and Ery (M). On-line monitoring and control of phosphate concentration in different fermentation technologies. **Acta Alimentaria** 16(1); 1987; 79-93

A computer-coupled autoanalyzer-fermentor system was developed for online study of microbial metabolism. Phosphate consumption, and other parameters were investigated in three fermentation processes. Phosphate consumption in the primary metabolism was monitored in **Methylomonas sp.** and **Saccharomyces cerevisiae** fermentations, and metabolic changes were studied in bacitracin - secondary metabolite - fermentation. The computer-coupled system was capable to realize the minimal variance control of phosphate level during the microbial process. It has been demonstrated that the system is suitable for on-line data processing and control, and for the analysis of synthetic and industrial fermentation media. It provides useful information for further development of the fermentation of primary and secondary metabolites. It can be flexibly applied to various analytical purposes and to the study of different quality fermentation broths. AS

2153 Williams (D). Microprocessor control of a fed batch fermentation using an adaptive technique. **Process Biochemistry** 22(2); 1987; 49-54

This paper describes the implementation of an online mutivariable, adaptive controller on a fed-batch bakers' yeast fermentation. Details of the computer system, instrumentation and adaptive technique are described. Results are presented to show the successful, online implementation of the technique. AS

Microorganisms

Bacteria

2154 Jay (JM) and Bue (ME). Ineffectiveness of crystal violet tetrazolium agar for determining psychrotrophic gram-negative bacteria. **Journal of Food Protection** 50(2); 1987; 147-149

Gram-negative psychrotrophic and nonpsychrotrophic mesophiles grew equally well on crystal violet tetrazolium (CVT) agar at 30 C in 48 h, hence this medium is not suitable for enumerating on recognizing psychrotrophic bacteria. AS

Fungi

Aspergillus parasiticus

2155 Buchanan (RL), Zaika (LL), Kunsch (CA), Purcell (CJ), Purcell (JJr) and Mertz (SE). Isolation of a caffeine-resistant mutant of **Aspergillus parasiticus**. **Journal of Food Science** 52(1); 1987; 194-196

A caffeine-resistant mutant of **Aspergillus parasiticus** NRRL 2999 was isolated and subsequently designated strain BCR1. The mutant strain grew in the presence of > 8 mg/ml caffeine, while growth of the parent strain was delayed by 1 mg/mL and inhibited by 2 mg/mL. Strain BCR1 produced abundant amounts of aflatoxin only when cultured in media containing caffeine. Residual caffeine analyses indicated that caffeine-resistance in BCR1 was not due to the metabolic elimination of caffeine. AS

Mushrooms

2156 Ogawa (T), Oka (Y) and Sasaoka (K). Amino acid profiles of common cultivated mushrooms including the identification of N-(N-Gamma-L-glutamyl-3-sulpho-L-alanyl) glycine in **Flammulina velutipes**. **Journal of Food Science** 52(1); 1987; 135-137

This study was undertaken to obtain more detailed data, especially amino acid profiles of the NPN and protein N fractions including the occurrence of a novel glutathione analog in **Flammulina velutipes** to increase the very limited information on the N profiles of the cultivated mushrooms. It was seen that the proportion of the NPN to the total N was relatively high and large amounts of the NPN were made up of free amino acids and related compounds. Based on these studies a practical N-protein conversion factors for the cultivated mushrooms may be considered to be about 4 on the average. NGKR

2157 Pecora (RP), Sacchetta (RA) and Guzman (CA). Some essential elements of two species of **Boletus** grown in Cordoba (Argentina). **Journal of Food Science** 52(1); 1987; 216-217

The concn. of Mg, Fe and Zn were determined by atomic absorption spectrophotometry and necessary information on the amount of K, Ca, Cu, Mn and Co of these two types of edible mushrooms (**Boletus tropicus** and **Boletus granulatus**) analysed in a form in which they reach the consumer. The results showed that the values obtained for Fe and Mn were three times higher in these mushrooms whereas similar values were obtained with both mushrooms for K, Ca, Mn, Zn and Cu. No cobalt was detected in these samples. NGKR

Yeasts

2158 Jones (RP). Effect of the relative concentration of ion species on yeast growth and ethanol production. **Process Biochemistry** 21(6); 1986; 183-187

The effect of successive two-fold dilutions of the inlet cations Mg^{2+}, Cu^{2+}, Mn^{2+}, Fe^{2+}, and Cu^{2+} on the performance of **Saccharomyces cerevisiae** UQM 70Y in continuous cultivation using a refined glucose-vitamin-mineral salts medium was determined at the respective steady states. At one-quarter strength of the respective optimum concn. of these ions the values of Y_{xs} and Y_{ps} decreased dramatically such that washout occurred at 1/16 strength. Contrary to expectation, the cellular levels of Mn^{2+}, Fe^{2+}, and Ca^{2+} increased with decreasing inlet concn. At optimum concn. of ionic species the cell biomass yield from glucose Y_{xs} was only 0.05 g^{-1} which is approx. half the value obtained in the presence of amino acids and/or yeast extract. AS

BIOTECHNOLOGY

2159 El-Shimi (NM), Mohsin (SM) and El-Magied (MMA). Bioconversion of some agricultural wastes by **Aspergillus foetidus**. **Egyptian Journal of Food Science** 15(1); 1987; 121-131

2160 Knon (D). Food biotechnology: Its organization and potential. **Food Technology** 41(4); 1987; 95-100

After briefly reviewing the history of biotechnology, the author discusses about the organization of food biotechnology, including product oriented approach, system oriented approach, and unit operations approach and research needs and the challenges ahead. KAR

2161 Srivastava (MG). Biotechnology - an Indian perspective. **Pesticides** 21(4); 1987; 11-19

The implications of biotechnology on the future of pesticide industry is examined. BV

TISSUE CULTURE

Nil

FOOD ADDITIVES

Colorants

2162 Francis (FJ). Lesser-known food colorants. **Food Technology** 41(4); 1987; 62-65

The colorants discussed include annatto, saffron and gardenia from plant sources, cochineal and related pigments from animal sources, monascus from microbial source, biliproteins from algae and some other minor miscellaneous colorants. KAR

Emulsifiers

2163 Lahtinen (S). A dynamic analysis model for stress decay in emulsions under steady shear rate. **Lebensmittel-Wissenschaft und-Technologie** 20(1); 1987; 26-28

A dynamic model containing four parameter and based on the law of mass action, was formulated for the characterization of stress decay in emulsions during stress-shear experiment. NaCl or one of two salt mixtures was added to an emulsion containing 1.0% of gelatin to test the model. Salt presence, pH and to a lesser extent, salt concn. and salt type, affected the parameter values. The model fitted the experimental data successfully. AS

Flavourings

2164 Institute of Food Technologists. Monosodium glutamate (MSSG) **Food Technology** 41(5); 1987; 143-146, 148, 150, 1

The role of monosodium glutamate (MSG) in foods and its advantages and disadvantages is discussed. Flavour properties, taste perception in the newborn, placental transfer of glutamate, safety of glutamate (acute and chronic, animal toxicity studies, central nervous system studies) dietary aspects of MSG use, MSG and dietary sodium, idosyncratic reactions and regulatory status are the aspects covered. 95 references. BV

Preservatives

Nisin

2165 Delves-Broughton (J). Focus on nisin. **Food Manufacture** 62(3); 1987; 63-64

Use of nisin as a food preservative in processed cheese; milk; canned foods, meat, fish and alcoholic beverages is discussed briefly. BV

Stabilizers

2166 Coia (KA) and Stauffer (KR). Shelf life study oil/water emulsions using various commercial hydrocolloids. **Journal of Food Science** 52(1); 1987; 166-172

This study compares and evaluates commercial hydrocolloids for shelf life stability in an oil/water emulsion system stored at 25 C. Observations of surface or interfacial changes and rheological parameters took place over 90 days. Parameters; n, pseudoplastic index; K, consistency index; and Tau_o , yield stress were reported. Apparent viscosities Eta_{20} (quality control index) and Eta_{50} (oral flow index) were monitored throughout the study and correlated well with stability changes. The study produced the following results: propylene glycol alginate promotes creaminess without significant rheological contribution (Eta_a , Eta_{20}, Eta_{50} and Tau_o). Xanthan gum contributes to body; however, oiling off was observed. Gum tragacanth and combination (xanthan, tragacanth and PGA, 1:1:1) act as bifunctional stabilizers, controlling both oiling off and body. AS

Gums

2167 Kokini (JL) and Plutchok (GJ). Predicting steady and oscillatory shear rheological properties of CMC-guar blends using the Bird-Carreau constitutive model. **Journal of Texture Studies** 18(1); 1987; 31-42

The Bird-Carreau constitutive model, a five parameter semi-empirical set of equations, was used to predict the steady shear viscosity ETA , the dynamic viscosity ETA , and the out-of-phase component of the complex viscosity divided by frequency ETA'' / Omega , for aqueous blends of sodium carboxymethylcellulose (CMC) and guar gum. The five Bird-Carreau constants were derived from equations which correlate the constants to concn. and mol. wt. of the CMC/guar blends. Blends of ratios 3:1, 2:1, 1:1, 1:2 and 1:3 by wt. were studied in concn. of 0.5, 0.75, 1.0 and 1.5% by wt. For most blends the model accurately predicted the experimental ETA and ETA'' data in the frequency/shear rate range of 0.1-100 s^{-1} and the experimental ETA /Omega data in the frequency /shear rate range of 1.0-100 s^{-1}. AS

CEREALS

2168 Denis Page (B), Harvey Nesome (W) and MacDonald (SB). Determination of several halogenated fumigants in cereal products by steam distillation and capillary gas chromatography with electron capture detection. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 446-450

A steam distillation procedure is described for the detn. of ethylene dibromide (EDB), ethylene dichloride (EDC) and carbon tetra chloride in flour, flour based mixes, baked cakes, breakfast cereals and citrus fruits has been described. MVG

2169 Rasco (BA), Dong (FM), Hashisaka (AE), Gazzaz (SS), Downey (SE) and San Buenaventura (ML). Chemical composition of distillers' dried grains with solubles (DDGS) from soft white wheat, hard red wheat and corn. **Journal of Food Science** 52(1); 1987; 236-237

The change in proximate composition of each of the distillers' dried grains with solubles (DDGS) from soft white wheat, hard red wheat and corn with respect to the starting grains has been determined with a view to its utilisation as animal feed. It has been found that many of the differences ($P < 0.05$) in the concn. of lipid, protein and crude fibre were also present both in the starting grains and the DDGS products. NGKR

Barley

Barley proteins

2170 Tallberg (A) and Eggum (BO). Grain yields and nutritional qualities of some high-lysine barley hybrids. **Journal of Cereal Science** 4(4); 1986; 345-352

Grain yields, chemical composition, protein qualities, digestible energies and protein compositions were evaluated for high-lysine barley hybrids from crosses with mautant 7 in comparison with a high-lysine Hiproly-line and standard cv. Protein quality assessment was based on amino acid composition, true protein digestibility, biological value, net protein utilisation and utilisable protein as determined in nitrogen balance experiments with rats. Nutritional quality was improved by the enhanced level of lysine and threonine since the biological value of the protein was significantly higher in the mutant 7-hybrids compared with normal barley. Despite the highest yield of total as well as digestible energy per ha being obtained for a standard cv., the ratio between utilisable protein and digestible energy was more favourable for some of the high-lysine samples. Thus high-lysine barley, although lower-yielding than standard cultivars, may have advantages over the standard cultivars in animal diets. AS

Oats

Oat flours

2171 Ponnampalam (R), Goulet (G), Amiot (J) and Brisson (GJ). Some functional and nutritional properties of oat flours as affected by proteolysis. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 279-285

Oat flour was hydrolyzed with Alcalase (A) and Neutrase (N) to the following degree of hydrolysis (DH): 3.8 (A1), 7.6 (A2), 6.0 (N1), 10.4% (N2). The functional and nutritional properties of the resulting products were compared to those of control oat flours and commercial whole wheat and soy flours. Water hydration capacity and isoelectric solubility increased with increase in DH. Proteolysis reduced emulsifying stability, fat-binding capacity, and heat coagulability when compared to controls. These properties were comparable or higher when compared to soy flour, except for A2. Water-soluble proteins had fragments of 925, 645, 395, and 230 mol. wt. in Alcalase-treated and 835, 565, 340, and 195 mol. wt. in Neutrase-treated oat flours. No significant differences were observed in the protein efficiency ratio (PER) among controls and enzyme-modified oat flours. There was a significant ($P < 0.05$) but small decrease in the nitrogen apparent digestibility coefficient in Alcalase-treated oat flours. AS

Rice

2172 Joshi (SV), Jaisani (JC), Gaikwad (WS) and Mathew (TV). Chemical evaluation of volatile reducing substances in rice. **Research and Industry, India** 32(1); 1987; 31-34

The flavouring constituents of rice, which are steam volatile reducing substances, are dislodged by cooking rice in 1.7% aqueous potassium hydroxide in preference to water. These flavouring constituents are absorbed in alkaline potassium permanganate, employing a simple assembly and reduction of potassium permanganate is estimated. The amount of potassium permanganate so reduced is directly proportional to the flavouring constituents in rice. Number of mg of potassium permanganate reduced by volatile reducing substances from 100 g of rice is expressed as V.R.S. No. Marked difference in V.R.S. No. of scented and non-scented rice var. was observed. The V.R.S. No. (mg of potassium permanagante reduced/100 g rice) of scented var. ranged from 108.74 to 164.37 and that of the non-scented var. 68.28 to 78.39. Basmati showed max. V.R.S., No. of 164.37. AS

Wheat

2173 El-Shirbeeny (A) and Allam (M). The 1000-seed weight of wheats in relation to the technological properties of wheat. **Egyptian Journal of Food Science** 15(1); 1987; 83-90

The correlations between 1000 seed wt. and each of other tests, namely hectoliter, flour extraction, ash, starch, protein, gluten and sedimentation test are studied for serving breeding program. MVG

2174 Kaldy (MS), Grant (MN) and Kosmolak (FG). Influence of parental lines on the nutritional quality of the protein in winter wheat. **Journal of Cereal Science** 4(4); 1986; 389-399

The protein content and protein (i.e. nutritional) quality of whole wheat and milling fractions of a winter wheat cv., Norstar, were compared with its parents, Winalta and Alabaskaya, and a Bebraska cultivar, Lancota. Although Winalta has a relatively high protein quality and Alabaskaya a relatively low protein quality, the progeny, Norstar, had a quality surpassing even that of Winalta. This shows that Alabaskaya did not adversely effect the protein quality of Norstar. However, Alabaskaya contributed to the enhanced winter-hardiness of Norstar, which is superior to that of Winalta. Protein content varied among cv., and between whole wheat and milling fractions. Lancota whole wheat had the highest protein content and Norstar had the lowest. The quality of the protein in the various fractions differed among cultivars and between whole wheat and the milling fractions. Norstar had 3% higher protein quality than Winalta, 8% higher than Alabaskaya, and 6% higher than Lancota for whole wheat. Norstar also had the highest protein quality in flour and screenings. Lancota had the highest protein quality in bran and shorts. Lysine was the first limiting amino acids in whole wheat, flour and screenings; isoleucine was first limiting in bran and shorts. There was an inverse relationship between the proportions of lysine in the protein and total protein content for most of the grains and fractions studied. AS

2175 Malhan (S) and Rekhi (T). Wheat - consumption - present scenario. **Indian Miller** 17(5); 1987; 5-7,9,11,13

The nutritive value of wheat is compared with that of rice and various food uses of wheat are discussed. MVG

2176 Narpinder Singh, Sekhon (KS) and Nagi (HPS). Laboratory sprout damage and effect of heat treatment on milling and baking properties of Indian wheats. **Journal of Food Science** 52(1); 1987; 176-179

Comprehensive information on the effect of the degree of sprouting and heat treatment on the bread making properties of high yielding Indian wheat var. have been collected. These studies showed that sprouting of wheat had an adverse effect on the rheological and bread making properties of wheat. Heat treatment of sprout-damaged grains effectively but not completely checked the adverse effect of sprout damage. Flour recovery, diastatic activity and total sugars increased significantly in sprouted samples where damaged starch and gluten decreased with concominant increase in free amino nitrogen. The bread baked from sprouted wheat flours had smaller loaf volume with poor crumb characteristics but cookies exhibited better quality. NGKR

2177 Stevens (HH). Blending and conditioning of wheat. **Indian Miller** 17(6); 1987; 5-7, 9, 11, 13, 15-1

The theory involved in wheat conditioning and the practice followed by the millers for conditioning wheat; and the recent studies done on wheat conditioning, are the aspects covered in this paper. MVG

Wheat flour

2178 Islam (MD) and Johansen (HB). Physico-chemical tests - a basic for selecting the size of wheat flour. **Journal of Food Science and Technology, India** 24(3); 1987; 136-138

Using hammer mill, wheat flour was obtained with sizes of < 1410, < 1190, < 1000, < 710, < 590, < 500, < 350 and < 297 μ and were tested for alpha amylase, gluten washing, sedimentation value, and chapati baking. The test for chapati baking was done by adding 60, 70, and 80% water by wt. of flour and frying at 220 and 280 C. Falling number test indicated a slow but consistant decline in starch quality with particle size. A gradual decrease in sedimentation value with smaller particle size flour was observed. Sensory evaluation showed that flours upto 1000 μ particle size gave good chapatis and the water needed was 70% by wt. KAR

2179 Mesallam (AS), El-Shaarawy (MI) and Mustafa (AI). Effect of water from different sources in Saudi Arabia on the rheological properties of wheat flour and bread quality. **Acta Alimentaria** 16(1); 1987; 67-77

Water samples (tap water, springs, well water, potable treated water and sea water) collected from different locations of the Eastern province of Saudi Arabia were studied for their effect on rheological properties on Saudi wheat flour and bread quality. Results indicated that water with higher salinity has higher stability of doughs and peak viscosity of water-flour suspensions. Bread prepared with water of 1000-1500 mg per kg salt content have the best symmetry, break and shred, and overall acceptability. BV

2180 Siljestrom (M), Westerlund (E), Bhorck (I), Holm (J), AspN-G) and Theander (O). The effects of various thermal processes on dietary fibre and starch content of whole grain wheat and white flour. **Journal of Cereal Science** 4(4); 1986; 315-323

Dietary fibre (DF) and starch contained in raw processed materials from wheat were evaluated. The processes studied included extrusion cooking, drum drying, autoclaving, popping and steam flaking. Enzymatic-gravimetric method was used for soluble and insoluble DF components and a GLC method was used for complete characterisation of the constituent monosaccharides. Values for the total DF obtained by two method for a range of samples was closely correlated ($r = 0.99$; $P < 0.001$). Influence of various process on total DF were small; but a slight solubilisation of fibre components was observed for all process except in drum drying when severe conditions were employed. Severe popping condition also resulted in a loss of DF-rich outer layers of wheat kernel. Analysis of starch with two similar methods using the same types of enzymes but different incubation times and enzyme; substrate ratio, gave similar results and significant effects of processing were observed. MVG

Wheat proteins

2181 Hashem (M), Allam (M) and El-Shirbeeny (A). Studies on protein, gluten and sedimentation tests of wheats. **Egyptian Journal of Food Science** 15(1); 1987; 79-82

The important properties related to baking characteristics of wheat flours are dependent on the quantity and quality of the protein. When gluten washing is performed in breeding programms, the starch granules that separate the protein strands are removed thereby giving more points of contact that eventually the protein strands coalesce and form the gluten. The Zeleny test is a useful and a fairly reliable test for flour strength. MVG

2182 Huebner (FR) and Bietz (JA). Assessment of the potential breadmaking quality of hard wheats by reversed-phase high-performance liquid chromatography of gliadins. **Journal of Cereal Science** 4(4); 1986; 379-388

MILLETS

Corn

2183 Christopher Young (J), Locksley Trenholm (H), Friend (DW) and Prelusky (DB). Detoxification of deoxynivalenol with sodium bisulphite and evaluation of the effects when pure mycotoxin or contaminated corn was treated and given to pigs. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 259-261

Deoxynivalenol-(DON-)-contaminated corn was treated with aqueous sodium bisulphite in order to (a) determine optimum conditions for reduction in free DON levels and (b) evaluate in a feeding trial the effects of the bisulphite treatment on feed intake and wt. gains in pigs. The greatest reductions (upto 95% DON) were achieved when the contaminated corn was autoclaved for 1 h at 121 C in the presence of 8.33% aquoeus sodium bisulphite (600 mL/kg of corn, by wt.). In the feeding trial, a diet containing 7.2 mg of DON/kg from infected corn caused reduction in feed consumption and wt. gains by pigs. When the infected corn was autoclaved with sodium bisulphite, mixed with a basal diet, and fed to pigs for 7 days, feed intake and body wt. gain were improved compared with pigs fed untreated inoculated corn and were similar to the cases of the controls. In an additional toxicological trial using pure compounds, no effects were seen when DON sulphonate was administered orally to swine at the same level (molar equivalent) at which nonderivatized DON caused severe emesis. AS

2184 Garrote (RL), Luna (JA), Silva (ER) and Bertone (RA). Prediction of residual peroxidase activity in the blanching-cooling of corn-on-the-cob and its relation to off-flavour development in frozen storage. **Journal of Food Science** 52(1); 1987; 232-233

The thermokinetic model predicting is connected with experimental data obtained from the sensory evaluation of the frozen corn cob and by using this model the average peroxidase activity retention in the kernel and outer cob during blanching-cooling is predicted and thus making it possible to predict optimum conditions for frozen storage life or at ambient air temp. or at temp. between 2 and 20 C. NGKR

2185 Tosi (E), Ciappini (M), Tapiz (L) and Masciarelli (R). Kinetics of corn drying. Empirical equation for drying in fluidized bed. **Revista de Agroquimica y Tecnologia de Alimentos** 27(1); 1987; 60-66 (Es).

In order to calculate the parameter RH = (H Theta - H_{eq})/(H H_{eq} for its application in the design of fluidized bed dryers for corn, the Luikov equation for capillary and porous solids was applied adopting the diffusion coefficient proposed by Pabis and Henderson (J. **Agric. Eng. Res. 6**, 1961, 272-277). In this way differences found between calculated and experimental values rose to 20-30% in most cases. An empirical equation to calculate RH from air temp. (T) and residence time (Theta) was then developed. This equation -RH = 0.4771 $T^{0.1301}$ /. exp (-0.0013 Theta. exp 0.0288 T) with T in C and Theta in seconds - provide differences between calculated and experimental values not higher than 10% in the tested conditions (load density 20-60 kg/m^2 ; air temp. 40-120 C; air velocity 1.8 m/s). AS

Corn proteins

2186 Augustine (ME) and Baianu (IC). High-resolution carbon-13 nuclear magnetic resonance studies of maize proteins. **Journal of Cereal Science** 4(4); 1986; 371-378

The first high-field, high-resolution carbon-13 nuclear magnetic resonance spectra of zein, and two sub-fractions obtained by extraction in aqueous alcohol systems, are reported. Solubility of zein was also investigated in fourteen different organic solvents and found to be optimal in 100% DMSO and 50% pyridine-water. The effects of extraction or pretreatment of zein with specific solvents were also investigated. Spectral assignments are proposed for zein based on a comparison of the carbon-13 chemical shift values for peaks in the zein spectra with previously published carbon-13 chemical shift assignments for proteins. Biochemical characterization of the protein samples by SDS-PAGE and amino acid analysis were carried out in parallel with the NMR studies to aid in the interpretation of NMR spectra. AS

Corn starch

2187 Richardson (SJ), Steinberg (MP), De Vor (RE) and Sutherland (JW). Characterization of the oxygen-17 nuclear magnetic resonance water mobility response surface. **Journal of Food Science** 52(1); 1987; 189-193

This study uses factorial design techniques to investigate the

Oxygen-17 Nuclear Magnetic Resonance (NMR) relaxation rate response surface of a corn starch-water system as affected by three experimental conditions: concn., time between sample preparation (hydration) and measurement and storage temp. It was found that neither time (between 0.1 and 20 h) nor the storage temp. (room temp. and low temp.) had a significant effect on the oxygen-17 NMR relaxation rate response. The only variable which affected the oxygen-17 NMR relaxation rate was the concn. of corn starch in water (10-70%, w/w). Mathematical modelling of the dependence of the oxygen-17 NMR response on concn. is discussed in detail. AS

Ogi

2188 Adeyemi (IA) and Beckley (O). Effect of period of maize fermentation and souring on chemical properties and amylograph pasting viscosity of **ogi**. **Journal of Cereal Science** 4(4); 1986; 353-360

Changes in the pH of the steeping and souring water, titratable acidity, starch, damaged starch, diastatic activity and liquefaction number of **ogi**, during fermentation of maize, as well as the souring of **ogi** slurry and maize flour, were investigated. The practice of wet-milling significantly reduced damaged starch levels, whereas starch content decreased as fermentation or souring proceeded. Starch content and amylograph peak viscosity were higher for wet-milled **ogi** (75-89% w/w and 1030-1250 Brabender units) than dry-milled **ogi** (53-61% w/w and 740-960 Brabender units). Stability, index of gelatinisation and Adams Consistometer values decreased with either fermentation or souring time. The implications of these parameters for **ogi** quality are discussed. AS

2189 Akingbala (JO), Onochie (EU), Adeyemi (IA) and Oguntimein (GB). Steeping of whole and dry milled maize kernels in **ogi** preparation. **Journal of Food Processing and Preservation** 11(1); 1987; 1-11

Ogi was prepared by steeping whole kernels and dry milled flour in water for 72 and 18 h resp. Steeped maize and mash were wet milled, sieved and sedimented. Yields of **ogi** by the two methods was not different. Steeping of maize before milling is a better method of **ogi** preparation because it produced **ogi** with better **porridge** and stiff gel properties and also better nutrient composition than steeping of dry milled maize. KAR

Sorghum

2190 Fapojuwo (OO), Maga (JA) and Jansen (GR). Effect of extrusion cooking on **in vitro** protein digestibility of sorghum, **Journal of Food Science** 52(1); 1987; 218-219

The effect of key extrusion variables such as moisture, temp. and screw speed on protein digestibility on two var. of low tannin sorghum extruded with 0, 2 and 4% calcium hydroxide were studied. It was observed that the improvement of protein digestibility with extrusion was not due to tannin detoxification. Samples containing calcium hydroxide which is known to detoxify tannins showed better digestibility after heat treatment. Protein digestibility was determined by **in vitro** pepsin assay. Extrusion improved digestibility from 45.9 to 74.6% and 43.9 to 68.2% for the two var. resp. Temp. was the key factor that influenced digestibility whereas screw speed and moisture did not have any effect and alteration of pH before extrusion improved the digestibility further. NGKR

2191 Thammarutwasik (P), Koba (Y) and Ueda (S). Alcoholic fermentation of sorghum without cooking. **Biotechnology and Bioengineering** 28(7); 1986; 1122-1125

Sorghum was used as raw material for alcoholic fermentation, without cooking. Two var. of sorghum grown in Thailand, KU 439 and KU 257, contained 80.0 and 75.8% of total sugar. Optimum amount of sorghum for alcoholic fermentation should be between 30 and 35% (w/v) in the fermentation broth. In these conditions 13.0 and 12.6% (v/v) of alcohol could be obtained in 84 and 91.9% yield based on the theoretical value of the starch content from KU 439 and KU 257, resp. AS

Sorghum flour

2192 Akingbala (JO) and Rooney (LW). Paste properties of sorghum flour and starches. **Journal of Food Processing and Preservation** 11(1); 1987; 13-24

The paste properties of sorghum starch and flour were measured. Mean swelling power and solubility of starch showed significant varietal differences that were highly correlated with the amylose content of the var. There was a significant difference in means of the apparent gelatinization temp. of starch from sorghums grown in different years. The mean apparent gelatinization temp. of sorghum flours was 10 C greater than observed for sorghum starch and was dependent on the particle size of the flour. Apparent peak pasting viscosity of waxy starch was greater than that of the non waxy. However the apparent peak pasting viscosity of the non waxy flour was greater than that of the waxy. Apparent viscosities were greater for pastes from smaller than larger flour particles in both acid and alkali pHs. AS

Sorghum proteins

2193 Taylor (JRN) and Schussler (L). The protein compositions of the different anatomical parts of sorghum grain. **Journal of Cereal Science** 4(4); 1986; 361-369

A comprehensive picture of the distribution of proteins in two low-tannin sorghum cv. was obtained by hand-dissection of the kernels into their anatomical parts: endosperm, germ and pericarp. The proteins in each part was characterized by Osborne-type fractionation, amino acid analysis and electrophoresis. Approx. 80% of grain nitrogen was in the endosperm, the majority being in the form of prolamin protein that was endosperm-specific. The second largest protein fraction in the endosperm was G_3-glutelins. The germ contained approx. 16% of the grain nitrogen, most of which occurred as low mol. wt. nitrogen and albumin and globulin proteins. The major location in the grain of albumins and globulins was the germ, and it was found that these proteins were rich in essential amino acids, especially lysine. Only approx. 3% of the grain nitrogen was found in the pericarp and the largest single fraction of this pericarp protein was unextractable under standard conditions. AS

Sweet corn

2194 Di Pentima (JH) and Guemes (DR). Thermal diffusivity and heat transfer characteristics of husked sweet corn. **Lebensmittel-Wissenschaft und-Technologie** 20(1); 1987; 12-15

Tests were carried out to determine the thermal diffusivity and heat transfer characteristics of husked sweet corn. The density, water content and thermal diffusivity of kernels and cob samples were measured, as well as the effective thermal diffusivity for whole ears. Experimental thermal diffusivities obtained were 1.24 x 10^{-7} /m^2s for cobs and 1.28 x 10^{-7}/m^2 s for kernels, while the effective thermal diffusivity was 1.37 x 10^{-7} /m^2 s. Temp. response curves from experimental air cooling were compared with those obtained by simplified models that consider the sweet corn ear as an homogeneous cylinder or as comprising two concentric layer. It is concluded that for practical applications, it is valid to use the effective thermal diffusivity and homogeneous solutions to predict temp. response as a function of time during cooling operations. AS

PULSES

Blackbeans

2195 Hohlberg (AI) and Stanley (DW). Kinetics of bean protein thermal denaturation. **Journal of Food Processing and Preservation** 11(1); 1987; 31-42

A kinetic model for the thermal denaturation of the 7S protein of common black beans **(Phaseolus vulgaris)** was developed. Kinetic parameters were obtained by analyzing peaks in the DSC thermogram using the Borchardt and Daniels method. The reaction order for phaseolin denaturation was found to be close to 2.5, with an activation energy of 932 KJ/mol. and a pre-exponential factor of 127 min^{-1}. KAR

Cowpeas

2196 McWatters (KH), Chinnan (MS), Worthington (RE) and Beuchat (LR). Influence of storage conditions on quality of cowpea seeds and products precessed from stored seeds. **Journal of Food Processing and Preservation** 11(1); 1987; 63-76

Effects of storing cowpeas **(Vigna unguiculata)** at 2 C /65%R.H., 21 C/55% R.H., and 35 C/65% R.H. for 10 months in open metal cans, in high density polyethylene bags flushed with 100 % carbon dioxide were determined. No major adverse quality changes occurred in cowpeas stored at 2 or 21 C when evaluated as a reconstituted boiled vegetable. Peas stored at 35 C absorbed less water during soaking and required greater force to shear after boiling than peas stored at 2 or 21 C. The rate of death of yeasts and molds on cowpeas stored at 2 C was slower than the rate of death at 21 or 35 C. Decortication efficiency improved under the conditions of storage and may be related to an increase in seed hardness. Cowpeas stored at 2 and 21 C produced akara (fired cowpea paste) with better overall sensory quality than peas stored at 35 C. AS

Great Northern beans

2197 Reddy (NR) and Pierson (MD). Isolation and partial characterization of phytic acid rich particles from Great Northern beans **(Phaseolus vulgaris L.)**. **Journal of Food Science** 52(1); 1987; 109-112

Phytic acid-rich particles were isolated from a combined density fraction (CDF) of Great Northern beans. CDF contained more than 80% of the total phytic acid, and 70% of the total crude protein and substantial amounts of certain minerals. CDF had phytic acid in both water soluble and water insoluble forms. An isolate containing phytic acid-rich particles were prepared from CDF using a Tris-base solution. The phytic acid-rich isolate contained 26.6% phytic acid, 34.3% protein, 30.0% total carbohydrates, 0.6% calcium, 2.1% magnesium, and 0.3% potassium. Chemical analysis and fractionation of CDF indicated that the water insoluble form of phytic acid in Great Northern beans was present as a salt of calcium-magnesium-potassium in association with proteins. AS

Snap beans

2198 Resurreccion (AVA), Shewfelt (RL), Prussia (SE) and Hurst (WC). Relationships between sensory and objective measures of postharvest quality of snap beans as determined by cluster analysis. **Journal of Food Science** 52(1); 1987; 113-116

This study was to use cluster analysis to determine relationship between the sensory and objective measures of post harvest quality of snap beans for the fresh market and to identify the most important measures of post harvest quality in snap beans. The results indicated that acceptability, mouthfeel and flavour were the most important subjective measures while pre angle and moisture were the most important objective measures of postharvest quality. These conclusions were drawn from seventeen sensory, physical and chemical measurements of post harvest quality obtained from 72 snap bean samples during four separate experiments. NGKR

Winged beans

2199 King (RD) and Puwastien (P). Effects of germination on the proximate composition and nutritional quality of winged bean (**Psophocarpus tetragonolobus**) seeds. **Journal of Food Science** 52(1); 1987; 106-108

This study was carried out to examine the effects of germination on the `proximate composition of winged beans and on some aspects of the nutritional quality of the seeds. It was seen that the nonprotein N was found to increase gradually and protein N to decrease and a slight decrease in the lipid content during germination. However the trypsin inhibitor activity was not affected and lipoxygenase activity was found to decrease. Between paper technique was employed because of the low levels of microbial contamination, high rate of germination compared to other techniques. NGKR

OILSEEDS AND NUTS

Brazil nuts

2200 Sun (SSM), Leung (FW) and Tomic (JC). Brazil nut (**Bertholletia excelsa** H. B. K.) proteins: Fraction, composition, and identification of a sulphur-rich protein. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 232-235

An improved procedure was developed to fractionate the total protein from Brazil nut into three size classes of proteins, 11S, 7S, and 2S. The protein components and amino acid compositions of these protein fractions were analyzed. By sodium dodecyl sulphate-polyacrylamide gel electrophoresis, the 11S protein fraction was resolved into six major polypeptides (Mr 24 000-32 000); the 7S protein fraction contained five major polypeptides (14 000-45 000); and the 2S protein contained two low mol. wt. polypeptides (9000, 3000). All three protein fractions contain high concn. of glutamine/glutamic acid and arginine. But the 2S protein contains exceptionally large amounts of the S amino acids, 17.9% Met and 8.7% Cys. This S-rich protein constitutes some 30% of the total extractable Brazil nut proteins. A gel filtration procedure was developed for preparation of large quantities (300 mg/run) of pure S-rich protein for further studies. AS

Canola

2201 So-Yan Lu), Kim H), Eskin (NAM), Latta (M) and Joshnson (S). Changes in phytase activity and phytate during the germination of six canola cultivars. **Journal of Food Science** 52(1); 1987; 173-175

The levels of phytase activity and phytate in four var. of summer rape species (**Brassica napus**) and two var. of summer turnip rape species (**Brassica compestris**) have been determined during the germination period of 8 days. It was found that the cv., Regent exhibited the lowest level of phytate as well as the highest phytate activity. Germination of Regent for upto 2 days resulted in the reduction of phytate from 1.26% to 0.85% without any deleterious changes in the quality or quantity of the oil, based on the negligible levels of free fatty acids produced. NGKR

Groundnuts

2202 Chandrasekhara (HN) and Ramanatham (G). Studies on high protein breakfast food based on calcium groudnut proteinate. **Journal of Food Science and Technology, India** 24(3); 1987; 148-149

High protein break-fast food was prepared by blending calcium groundnut proteinate with wheat flour, followed by autoclaving, tempering, flaking and toasting. The toasted granules had water absorption capacity of 2.7 ml/g, bulk density of 1.59 g/ml, and viscosity of 460 Cp. PER of untoasted food was 2.26 which decreased to 1.4 on toasting. The available lysine (g/16 g N) was 5.10 which decreased to 2.20 on toasting. KAR

2203 Chaturvedi (A) and Geervani (P). Bioavailability of niacin from processed groundnuts. **Journal of Nutritional Science and Vitaminology** 32(3); 1986; 327-334

Groundnuts are fairly rich in niacin. Bioavailability of niacin from roasted and boiled groundnuts was assessed in adult human subjects. A local var. commonly cultivated in Andhra Pradesh, India was used in the study. Six women in the age range of 23-25 years were selected for the study. The linear dose response technique was used to assess the availability. Excretion of N′-methylnicotinamide in urine was used as an index of assessment. The results revealed that 87.0 to 91.7% of niacin was available from roasted and boiled groundnuts, resp.

2204 Singleton (JA) and Pattee (HE). Effects of induced low-temperature stress on raw peanuts. **Journal of Food Science** 52(1); 1987; 242-244

The effects of freeze damage on membrane permeability have been assessed to characterise certain volatile components that contribute to flavour detn. in peanuts. It has been shown that peanuts exposed to 0 C temp. for 6 h exhibited metabolic injury and temp. below -2 C caused considerable damage in peanuts. Acetaldehyde and ethanol production increased in peanuts exposed to low temp. Membrane leakage also occurred. NGKR

2205 Wilson (PW), Pichardo (FJ), Liuzzo (JA), Blackmon (WJ) and Reynolds (BD). Amino acids in the American groundnut (**Apios americana**). **Journal**

of Food Science 52(1); 1987; 224-225

The American groundnut (**Apios americana**) has been analysed for amino acid composition using ion exchange column chromatography. It was found that aspartic and glutamic acids were the predominant amino acids in both seeds and tubers. Other amino acids present in significant quantities were leucine, histidine and proline. The most abundant free amino acids were found to be arginine and leucine in the seeds and histidine and serine in the tubers. NGKR

Groundnut butter

2206 Campanella (OH) and Peleg (M). Squeezing flow viscosimetry of peanut butter. **Journal of Food Science** 52(1); 1987; 180-184

The rheological properties of peanut butter using lubricated squeezing flow viscosimetry have been determined in two types of lubricated squeezing flow tests one based on constant deformation rate and the other on deformation under constant stress. Elongational flow was observed in both types of test and peanut butter could be described as a power law fluid with consistency on the order of 70-200 kPa and flow index of 0.5-0.7. NGKR

Linseeds

2207 Susheelamma (NS). Isolation and properties of linseed mucilage. **Journal of Food Science and Technology, India** 24(3); 1987; 103-106

Linseed mucilage was isolated by aqueous extraction and precipitation with acetone or ethanol. The viscosity of aqueous dispersions of the mucilage has been studied as a function of concn. pH and temp. AT 0.5-0.6% concn levels guar gum dispersions had nearly twice the viscosity as that of linseed polysaccharide; max. viscosity was found at pH 5-7, and greater decrease was found on the acidic side of pH. Viscosity decreased at higher temp. Chlorides of Na, K as also Ca decreased the viscosity less and ferric salts and KI decreased the viscosity more. Carbonates of Ca and Mg increased the viscosity. Among organic salts sodium acetate, sodium potassium tartrate and sodium citrate and potassium citrate decreased the viscosity almost to equal extent, whereas ferric citrate reduced the viscosity by 50%. The mucilage at about 1% concn. stabilised the foam formed by surface activity proteins of peanut and sesame flours against thermal disruption. KAR

Mustard

2208 Palmer (MV), Yeung (SP) and Sang (JP). Glucosinolate content of seedlings, tissue cultures, and regenerant plants of **Brassica juncea** (Indian Mustard). **Journal of Agricultural and Food Chemistry** 35(2); 1987; 262-265

Glucosinolate content of Indian mustard cotyledons during seed development and in vitro culture of regenerant plants derived from these cultures has been studied in order to establish the chemical basis for an improved screening procedure. MVG

Rapeseeds

2209 Klepacka (M). Thermal analysis and infrared spectroscopy study of changes in heat-denatured rapeseed proteins. **Acta Alimentaria** 16(1); 1987; 53-59

Proteins from rapeseed (three var.) extracted with water or salt solutions (5% potassium sulphate and 10% sodium chloride) were heated at 80 C and 100 C. The precipitates were examined, using thermal analysis and infrared spectroscopy. Analysis of the thermo-analytical curves of the precipitates showed that the losses in mass (TG curve) in the range of 400-800 C temp. were irreversibly dependent in case of the precipitates obtained (80 C and 100 C), on proteins extracted with 10% sodium chloride, as compared with the precipitates obtained from proteins extracted with water or 5% potassium sulphate. Similarly different dependences were observed in protein precipitates from salt extracts with sodium chloride during the analysis of relationship between absorptions Amide I and II and the band at 1090 cm^{-1}. The stated differences depended mainly on the protein fractions and not on the var. of the rapeseed. AS

Soybeans

2210 Brandon (DL), Haque (S) and Friedman (M). Interaction of monoclonal antibodies with soybean trypsin inhibitors. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 195-200

The antigenicity of the Kunitz trypsin inhibitor was studied by use of polyclonal antibodies prepared by inoculating rabbits with native, heat-denatured, and N-acetylcysteine-treated Kunitz soybean trypsin inhibitors as well as monoclonal antibodies prepared in mice. Antibodies elicited with the denatured inhibitor were specific for the denatured conformation of the protein. In contrast, native inhibitor elicited antibodies that selectively recognized determinants in both native and heat-treated proteins, but that did not bind trypsin inhibitors treated with N-acetylcysteine. The results imply that the disulfide bonds must be intact to maintain the native antigenic conformation and that the inhibitor has at least two distinct antigenic sites (epitopes), one of which is retained under denaturing conditions. They also suggest that monoclonal antibodies can be used to measure processing-induced structural changes in food proteins that may alter allergic reactions. AS

2211 King (DL) and Klein (BP). Effect of flavonoids and related compounds on soybean lipoxygenase-1 activity. **Journal of Food Science** 52(1); 1987; 220-221

Flavonoids are polyphenolic in structure and might possess antioxidant properties and the use of these compounds in the prevention of lipoxygenase dependent lipid oxidation have been investigated. It has been observed that all flavonoids and related compounds resulted on atleast 10% inhibition of lipoxygenase activity on an equal wt. basis. This was compared to inhibition by BHA and BHT and it was shown that Kaempferol, caffeic acid and chlorogenic acid showed inhibition comparable to that of BHT and rutin was the most effective inhibitor of lipoxygenase activity. NGKR

2212 Liu (K) and Markakis (P). Effect of maturity and processing on the trypsin inhibitor and oligosaccharides of soybeans. **Journal of Food Science** 52(1); 1987; 222-223

The immature soybean seeds used as human food contain antinutritional factors. The effect of processing like steaming or cooking for 20 min as commonly practised was seen fully eliminate trypsin inhibitor activity (TIA) in immature seeds. Soaking (24 h) plus cooking (20 min) was also necesary for the complete disappearance of TIA in mature seeds. It was found that sucrose, raffinose and stachyose concn. increased significantly with maturation. Steamed or cooked immature seeds contained considerably smaller quantities of raffinose, stachyose, sugars associated with flatulence than similarly treated mature seeds. NGKR

2213 Moeljopawiro (S), Gordon (DT) and Fields (ML). Bioavailability of iron in fermented soybeans. **Journal of Food Science** 52(1); 1987; 102-105

This study was carried out to evaluate and compare the effects of fermentation using lactic acid bacteria on soybean meal along with two methods of heat processing in order to test the influence of heat on iron bioavailability. The results showed that the RBV of iron in boiled nonfermented soybeans was the lowest among the products tested and that fermentation by lactic acid bacteria increased the RBV of iron by decrease of phytate content of soybean meal. NGKR

Soy proteins

2214 Iwabuchi (S) and Yamauchi (F). Electrophoretic analysis of whey proteins present in soybean globulin fractions. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 205-209

Whole extractable soybean proteins were separated into globulin and whey fractions by acidification to pH 4.8; however, this globulin fraction (acid-precipitated fraction) included large amounts of contaminating proteins in addition to the two major globulins glycinin and Beta-conglycinin and the minor globulin Gamma-conglycinin. Sodium dodecyl sulphate polyacrylamide gel electrophoresis showed that the acid-precipitated fraction included bands corresponding to lipoxygenase, agglutinin, trypsin inhibitor, and Beta-amylase. On treatment with ammonium sulphate, these bands, belonging to the whey proteins, were concentrated in the 0-51% ammonium sulphate precipitated fraction. Contaminating proteins in the acid-precipitated fraction were thus clearly isolated from the globulin fractions of glycinin and Beta-conglycinin. Similar results were obtained by masurements of extinction coeff. and SH groups, which are related to the purity of protein fractions. AS

2215 Iwabuchi (S) and Yamauchi (F). Determination of glycinin and Beta-conglycinin in soybean proteins by immunological methods. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 200-205

Glycinin and Beta-conglycinin contents in soybean seeds and in protein fractions were immunologically assayed. Whole extracted proteins (WBE) were composed of 32% glycinin, 23% Beta-conglycinin, and 45% remainder unassayed by anti-glycinin and anti-Beta-conglycinin. The acid-precipitable fraction (APF) at pH 4.8 was composed of 34% glycinin, 27% Beta-conglycinin, and 39% remainder. The protein composition of APF was similar to that of WBE. The crude 7S, precipitating at pH 4.8, was composed of 52% Beta-conglycinin, 3% glycinin, and 45% remainder. However, the remainder content in the pH 6.4 precipitated fraction (crude 11S) was reduced from 45% to 15%. Thus, the amount of contaminating protein in globulin fraction is proportional to the acidity. Treatment with 10% NaCl and ammonium sulphate fraction improved the glycinin plus Beta-conglycinin content. Contaminating proteins were evidently concentrated in a 0-51% saturated ammonium sulphate precipitated fraction. AS

2216 Kim (SH) and Kinsella (JE). Surface active properties of food proteins: Effects of reduction of disulphide bonds on film properties and foam stability of glycinin. Journal of Food Science 52(1); 1987; 128-131

This study was conducted to determine the effects of cleavage of disulphide bonds on surface active, film and foaming properties of glycinin. It was seen that reduction of soy glycinin with 5 mM and 10 mM dithiothreitol resulted in mol. conformational changes which enhanced mol. hydrophobicity and increased viscosity. These changes were associated with significant improvement in surface active properties of the reduced proteins. A relationship between the mol. flexibility of proteins, film properties and foam stability has been indicated. NGKR

2217 Mohamed (MO), Morris (HA) and Schmidt (RH). Effect of alkaline treatment on the dispersibility of soy protein isolates and properties of milk clots formed from nonfat milk and treated soy protein mixtures. **Journal of Food Science** 52(1); 1987; 91-97

Dispersibility of soy protein isolates was improved by adjusting pH to 12 and acidifying to pH 6.5. Alkaline treated isolates added to reconstituted nonfat milk reduced rennet induced coagulum firmness and syneresis more than did untreated soy protein isolates. Treated soy protein added to reconstituted nonfat dry milk reduced coagulum firmness and syneresis more than untreated soy protein. Soy protein interference with coagulum firmness and syneresis increased with an increase in pH becoming most severe at pH values above 11. Adjusting the pH of reconstituted NFDM in the absence of soy protein to pH 8 and holding for 30 min before adjusting it back to pH 6.5 had no effect on coagulum firmness or syneresis. However, higher pH treatment (pH 10 and above) caused reduction in coagulum firmness and in syneresis. AS

2218 O'Neill (TE) and Kinsella (JE). Flavour protein interactions: Characteristics of 2-nonanone binding to isolated soy protein fractions. **Journal of Food Science** 52(1); 1987; 98-101

The absorption coeff. at 280 nm of 1% solutions of pure soy proteins, Beta-conglycinin, glycinin, the acidic and basic subunits of glycinin were 6.04, 4.4, 8.04, 7.18, and 8.8, resp. Using equilibrium dialysis the binding affinities of these proteins for the model flavour compound 2-nonanone were determined. On an equivalent wt. basis soy protein, Beta-conglycinin and glycinin had approx. 5, 2 and 3 primary binding sites per 100,000 daltons and affinity constants (K) of 570,3050 and 540 M^{-1}, resp., i.e. Beta-conglycinin showed a five fold greater affinity for nonanone than the other soy protein. The acidic and basic subunits showed binding behaviour similar to that of glycinin. AS

2219 Sureshchandra (BR), Appu Rao (AG) and Narasinga Rao (MS). Effect of sodium dodecyl sulphate on the conformation of soybean glycinin. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 244-247

The effect of sodium dodecyl sulphate (SDS) on the conformation of glycinin from soybean (**Glycine max**) has been studied by the techniques of optimal rotatory dispersion, circular dichroism, fluorescence spectrophotometry, and viscosity measurements. The addition of SDS decreased the intensity of bands in the near-UV-CD spectrum of the protein, suggesting disruption of the tertiary structure. In the far-UV-CD spectrum the ellipticity values increased. Calculation of the Alpha-helical content of the protein showed that it increased with increasing SDS concn. This conclusion was supported by difference CD spectra, ORD, and fluorescence spectra data. The reduced viscosity of the protein did not change significantly with increase in SDS concn., indicating slight changes in hydrodynamic volume of the protein. AS

Sunflowers

2220 Madhusudhan (KT) and Srinivas (H). Effect of roasting on the functional properties of sunflower meal. **Lebensmittel-Wissenschaft und-Technologie** 20(1); 1987; 8-11

This study discussed the effect of salt roasting of sunflower kernels on the functional properties of defatted sunflower meal. Heat treatment reduced N solubility both in water and in 1M NaCl, emulsification and foam capacities, emulsion activity and emulsion stability. The water absorption and fat absorption capacities of the roasted meal varied marginally compared to control. AS

2221 Theertha Prasad (D). Characterization of sunflower albumins. **Lebensmittel-Wissenschaft und-Technologie** 201); 1987; 22-25

Sunflower albumins were found to contain approx. 4-4.5% phenolic compounds. Acid-butanol extraction for the preparation of phenol-free a meal removed 70-80% of the phenolic compounds from the defatted meal. Amino acid analysis, gel filtration chromatography and gel electrophoretic studies revealed significant differences between sunflower albumins prepared from the phenol-free and defatted meals. The low mol. wt. fraction (<5000 daltons) of the albumins contained high levels of phenolic compounds which appear to be strongly associated with proteins. The amino acid composition of the albumins and of their low mol. wt. fraction, showed the presence of high levels of arginine, glutamic acid and aspartic acid. The low mol. wt. albumin fractions also contained high levels of lysine. AS

TUBERS AND VEGETABLES

Root vegetables

Carrots

2222 Carbonell (JV), Madarro (A), Pinaga (F), Pena (JL) and Izquierdo (L). Dehydration of fruits and vegetables with ambient air. VI. Storage study of dried carrots. **Revista de Agroquimica y Tecnologia de Alimentos** 27(1); 1987; 96-106 (Es).

Effects of storage temp. on some quality factors of salted carrots dehydrated with ambient air were studied. Carrots dehydrated with air at 55 C were used as a reference product. After drying, agar plate counts of salted carrots (0.122 kg NaCl/kg d.m.) dehydrated with air at 23 C were 70-80% lower than those of the same dehydrated product with no salt added. At storage temp. < 22 C salted carrots dehydrated with ambient air had a shelf life similar to that of carrots dehydrated with air at 55 Degree C. Above 22 C both rehydration ratio and the Hunter a parameter decreased more rapidly in ambient air than in hot air dehydrated carrots. AS

Tubers

Potatoes

2223 Langdon (TT). Preventing of browning in fresh prepared potatoes without the use of sulphiting agents. Food Technology 41(5); 1987; 64, 66-67

A chemical treatment (citric acid with ascorbic acid) combined with a packaging system provides a 14+ day refrigerated shelf life for fresh prepared potatoes. Sliced potatoes can be stored for 14 to 20 days at 4 C without using sulphiting agents and with no perceptible colour difference from freshly sliced potatoes. Potatoes treated with combinations of citric acid and ascorbic acid and packaged in B-900 bags after 14 and 20 days looked, smelled, and had the texture of freshly sliced potatoes and were as white as the sulphited potatoes in B-900 bags. This method has great potential in other areas of fresh vegetables and fruits and may prove to be timely technological breakthrough in the face of increasing ban on use of sulphites as anti-browning agents. BV

2224 Stephen Clegg (B). Gas chromatographic analysis of fluazifop-butyl (Fusilade) in potatoes, soybeans, and soil. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 269-273

Potato chips

2225 Manan (JK), Joshi (GJ), Saxena (AK), Kalra (CL) and Berry (SK). Improvement in colour of deep fat fried potato chips from cold stored potatoes by lactic acid fermentation (**Lactobacillus plantarum**). **Journal of Food Science and Technology, India** 24(3); 1987; 139-141

Potato slices of 1.2 mm thickness were fermented with pure culture of **Lactobacillus plantarum** in 2.5% pasteurised brine at 32-35 C for 12 h. Changes in moisture, pH, acidity, reducing and total sugars were recorded at an interval of 4 h. For effective fermentation the optimum ratio of brine to potato slices was < 1:1. A fall in pH (6.65 to 3.96) reducing sugar (10.03 to 4.29% on moisture free basis) and an increase in lactic acid content (0.02 to 0.18%) were noticed after 12 h fermentation. Potato chips/wafers fermented for 12 h possessed golden yellow to white colour on deep fat frying. KAR

2226 Vickers (ZM). Sensory, acoustical, and force-deformation measurements of potato chip crispness. **Journal of Food Science** 52(1); 1987; 138-140

This study was made to compare auditory and oral judgements of crispness made only on a single product type, potato chips to determine whether the two types of crispness judgements were closely related when only one type of product not a wide variety was studied along with an instrumental methods of measuring crispness for total chips. It has been found that hypothesis, that crispness is a vibratory sensation needs to be modified to allow for the influence of non vibratory sensations. This study of potato chip product crispness suggested that these non-vibratory sensations may be detracting from or counteracting crispness. The use of combination of acoustical and force deformation measurements can produce an excellent prediction of potato chips crispness. NGKR

Yams

2227 Onayemi (O), Babalola (RO) and Badanga (A). Textural properties of cooked tropical yam (**Dioscorea** spp.). **Journal of Texture Studies** 18(1); 1987; 17-29

Some factors that affect the texture of cooked yams were evaluated in three yam species and the texture of fresh yam was compared with that of stored tubers in this study. The proximate composition for moisture, total solids, protein, ether extract, crude fiber, starch, ash and sp. gr. for freshly harvested yams. viz. white yam, water yam and yellow yam were determined. Cooking tests and textural characteristics of the cooked yam were also evaluated. The results showd that differences in the texture of yam varied with var., period of storage and changes in the starch granules upon cooking. In terms of mealiness the white yam is generally preferred to yellow or water yam. Various products such as yam flour, dehydrated instant pounded yam flour, chips, extruded products, balls etc., are shown to be technological possibilities. NGKR

2228 Osuji (GO) and Ory (RL). Regulation of allantoin and allantoic acid degradation in the yam and sweet potato. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 219-223

A mechanism whereby the end products of purine degradation, urea and glyoxylic acid, regulate the activities of allantionase, allantiocase and allantate amidohydrolase and condensation of urea and glycoxylate to form allatoin by the root tubers has been proposed. MVG

Vegetables

2229 Nyman (M), Palsson (K-E) and Asp (N-G). Effects of processing on dietary fibre in vegetables. **Lebensmittel-Wissenschaft und-Technologie** 20(1); 1987; 29-36

This study provides information on the effects of processing (i.e. freezing, water-blanching, cooking and canning) on dietary fibre of vegetables. Freezing had little effect on the total fibre in general, but a solubilisation of fibre was observed in Swedes. Blanching increased the dietary fibre content of Swedes on a dry-matter basis, due to losses of non-fibre components. A redistribution of insoluble to soluble fibre could be observed in carrots after blanching. Cooking increased the fibre content on a dry-matter basis, especially in carrots, but also to a certain extent in peas and beans, due to losses of nonfibre material during the cooking procedure. In Swedes, there was also a loss of dietary fibre as a result of cooking, whereas the dietary fibre in Brussels sprouts was unaffected by this process. Canning decreased the insoluble fibre content in Swedes; whereas the fibre content of carrots, peas, beans, and Brussels sprouts were unaffected. BV

2230 Vijaya Khader. Effect of cooking on nutrient losses of some common vegetables. **Andhra Agricultural Journal** 33(4); 1986; 361-366

The effect of cooking on Ca, Fe, P, thiamine and ascorbic acid in amaranth (**Amaranthus gangeticus**) and drumstick (**Moringa oleifera**) leaves; French beans (**Phaseolus vulgaris**) and cluster beans (**Cyamopsis tetragonoloba**), Potato (**Solanum tuberosum**) and yam (**Amorphophallus companulatus**) has been studied. The results indicate that it is difficult to suggest any single method as an ideal one for cooking all vegetables. Pressure cooking was better as it prevented loss of nutrients due to the small amounts of water used for cooking and the short cooking time. The Ca - P ratio was high in leafy vegetables. AS

Tomatoes

2231 Gurdeep Kaur and Bajaj (KL). Effect of room storage on the acidity and pigments in tomato (**Lycopersicon esculentum Mill.**) at different stages of maturity. **Indian Food Packer** 41(3); 1987; 19-22

Tomato var. (Punjab Chhuhara and Punjab Kesari) at 'red', 'turning red' and 'green' stages of maturity were stored at 31-35 C (room temp.) and 40-50% RH for 14 days and the changes in total carotene, lycopene and acidity were determined at 3 days interval. There was no significant change in total carotenoids in ‘red’ fruits of both the var. In ‘green’ and ‘turning red’ stages the carotenoids increased progressively, ‘green’ tomatoes of Punjab Kesari had higher carotene than Punjab Chhuhara at the end of storage. Lycopene content in ‘red’ fruits increased during 9 days of storage; while in turning ‘ red’ and ‘green’ fruits, it increased continuously in the beginning and then decreased in the end; the increase was more in Punjab Kesari than in Punjab Chhuhara. Acidity increased during storage in both the var. in all the three stages of ripening except in the case of the ‘red’ stage of Punjab Chhuhara which showed a slight decrease in acidity. ‘Red’ fruits of both the var. were spoiled after 9 days of storage, whereas ‘turning red’ were still of marketable quality. KAR

2232 Tanglertpaibul (T) and Rao (MA). Rheological properties of tomato concentrates as affected by particle size and methods of concentration. **Journal of Food Science** 52(1); 1987; 141-145

The shear rate-shear stress was obtained on tomato conc. made from juices that were produced using finisher screen openings: 0.020, 0.027, 0.033 and 0.045 in. In general the apparent viscosity of the conc. increased with increase in FSO. However, conc. made from juice using a 0.027 in FSO had the highest apparent viscosity. NGKR

2233 Tsuda (T) and Fukuba (H). Determination of L-ascorbic acid in tomato by isotachoelectrophoresis. Application of compouter simulation system for setting of determination conditions to avoid the mixed-zone problem. **Journal of Nutritional Science and Vitaminology** 32(3); 1986; 307-315

Wax gourd

2234 Wu (C-M), Liou (S-E), Chang (Y-H) and Chiang (W). Volatile compounds of the wax gourd (**Benincasa hispida**, Cogn) and a wax gourd beverage. **Journal of Food Science** 52(1); 1987; 132-134

The volatile compounds of the wax gourd (**Benincasa hispida**, Cogn) and wax gourd beverage were isolated and identified by kovats indices and mass spectra. The major compounds identified in the gourds were E-2 hexenal, n-hexanal and n-hexyl formate whereas in the beverages 2-5-dimethyl pyrazine, 2,6-dimethylpyrazine, 2,3,5-trimethylpyrazine, 2 methyl pyrazine and 2-ethyl-5-methyl pyrazine were found. NGKR

FRUITS

2235 Anon. Tropical fruit exports: Problem and potential for developing countries. **Food Technology** 41(5); 1987; 106

Contains 4 papers presented at the 46th Annual Meeting of the Institute of Food Technologists, Dallas, Texas, June 15-18, 1986: (1) Tropical food exports: Horticultural considerations by Carl -W. Campbell (p.108); (2) Processing alternatives for tropical exports by R.P. Bates and C.H. Brokaw (p.110); (3) Postharvest handling of fresh and dried tropical products by M.C. Bourne (p.120) and (4) Industry-partner or competitor in tropical food exports? by H. Weinstein (p.124). BV

2236 Long (AR) and Chism (GWIII). A rapid direct extraction-derivatization method for determining sugars in fruit tissue. **Journal of Food Science** 52(1); 1987; 150-154

This study was carried out to develop a GLC procedure for the detn. of free fructose, glucose and sucrose in freeze dried fruit tissues without extensive samples preparation or tedious extractions of the sugars from tissues. Trimethylsilyl derivatives of sucrose and TMS oxime derivatives of fructose and glucose were made directly from samples of freeze dried fruit tissues without a preliminary extraction of sugars and quantified using GC. This method allows for the isolation and quantitation of extractable free sugars such as fructose, glucose and sucrose from a solid matrix eliminating the need for large sample sizes and tedious extraction steps. Interferences due to contaminating compounds were not experienced and hydrolysis of sucrose was minimised. Strict attention to analytical detail is required to give consistent results. NGKR

2237 Ramesh Puri and Tajinder Sanghera. Nutritive value and consumption pattern of some processed foods. **Indian Food Packer** 41(3); 1987; 23-28

A consumption pattern survey for mixed fruit jam, orange squash and pineapple juice was done on 200 households in Chandigarh having different levels of income and education. Jam was consumed in all households irrespective of income, jam consumption increased linearly with the education level woman and total family income. Orange squash was consumed max. by high middle income families (Rupees 50-1000 per capita income). Pineapple juice consumption was more with rise in the family income; consumption of these foods showed a linear increase with higher education of women. Jam was found to be a conc. source of energy followed by orange squash and pineapple juice. Protein and other nutrients were very low in these products. These had also very low ascobric acid content as most of it got destroyed during processing. KAR

2238 Shibahara (A), Yamamoto (K), Nakayama (T) and Kajimoto (G). **Cis**-vaccenic acid in pulp lipids of commonly available fruits. **Journal of the American Oil Chemists" Society** 64(3); 1987; 397-401

Fatty acids of commonly available fruit pulps have been analyzed by capillary gas chromatography of their methylesters and by gas chromatography-mass spectrometry as their dimethyl disulphide adducts. The gas chromatographic and mass spectrometric data proved that these fruits always contained **cis**-vaccenic (**cis**-11-octadecenoic) acid as a component fatty acid of their pulp lipids. The concn. of **cis**-vaccenic acid in total octadecenoic acids ranged from 1.9% to 95.1% in the fruit pulps examined. The highest concn. of this acid was detected in pulp lipids of Japanese persimmon (**Diospyros kaki**). In fruit pulp lipids, **cis**-vaccenic acid was a common octadecenoic acid as well as oleic acid. AS

Apples

2239 Jain (HK) and Agnihotri (NP). Presence of thiophanate methyl and MBC residues in apple following post harvest dip. **Pesticides** 21(4); 1987; 31-32

2240 Mittal (JP), Mohsenin (NN) and Sharma (MG). Rheological characterisation of apple cortex. **Journal of Texture Studies** 18(1); 1987; 65-93

Apricots

2241 Naveen Kapoor, Bedi (KL) and Bhatia (AK). Chemical composition of different varieties of apricots and their kernels grown in Ladakha region. **Journal of Food Science and Technology, India** 24(3); 1987;

141-143

The chemical composition of 11 apricot kernels (Halman, Rakchaykarpo, Tokpopa, Rogan, Koban, Khuchuli, Shakarpara, Nari, Australian, Sufaidi and Normoo) grown in Ladakh region of India were determined as also the fatty acid composition of the kernel oils. The pits consistuted 7.3 to 19.0% (w/w) of the fresh fruit. The kernels formed 21.9 to 38.0% of the pits except in Koban var. Sufaidi var. had the highest oil content of 66.7% and Koban the lowest of 27.7%. Sugars varied from 5.2 to 12.9% excepting bitter kernels of Koban and Khochuli var. Kernels contain 20.27 to 45.25% protein. The oil is comprised of oleic (51-80%), linoleic (10-46%) and palmitic (3-11%) acids. KAR

Bananas

2242 Jayaraman (KS) and Ramanuja (MN). Studies on multiple forms of polyphenoloxidase from some banana cultivars differing in browning rates. **Lebensmittel-Wissenschaft und-Technologie** 20(1); 1987; 16-18

From nine to 13 isoenzymes were obtained by polyacrylamide gel isoelectric focusing, as compared to 7-11 obtained by gel electrophoresis in the partly purified polyphenoloxidase (PPO) from the ripe pulp of five banana cv. differing in browning rate. The patterns revealed some similarities and certain distinguishing features. The isoenzymes were generally focused in four pH regions, namely, 3.3, 4.2, 4.5-5.75 and 6.0-7.5 the predominant region being 4.5-5.75. On gel after electrophoresis, they showed differing specificities to various phenolic substrates and PPO inhibitors which were not apparent in direct assays. AS

Blueberries

2243 Sapers (GM), Matulaitis (RM) and Beck (JA). Detection of phenylalanine ammonia-lyase in the skin of blueberry and cranberry fruits. **Journal of Food Science** 52(1); 1987; 155-158

To determine the relationship between phenylalanine ammonia-lyase (PAL) activity, the anthocyanin content and fruit ripeness. An assay was developed for PAL for the skins of individual fruits like blueberry and cranberry. PAL was extracted from the skin of individual berries and assayed spectra photometrically. Analysis for total anthocyanin, soluble solids and titratable acidity were performed on the same berries. It was found that PAL activity was present at all maturity values in blueberry fruits and cv. differences in anthocyanin accumulation were not related to PAL activity. In cranberry fruit also it was not related to harvest date, cv. differences in anthocyanin accumulation or values of total anthocyanin and soluble solids on actidiy in individual berries. This was also retained during cold storage for 4 wk. NGKR

Dates

2244 Abd El-Magied (MM), El Shimi (NM) and Hassan (EM). Supplementation of snack food with pollen grains of date palm. **Egyptian Journal of Food Science** 15(1); 1987; 111-120

Grapefruits

2245 Adsule (PG), Ismail (MA) and Fellers (PJ). Quality of "Marsh" grapefruit following cold treatment as a method of disinfestation against the Caribbean fruit fly. **Journal of Food Science and Technology, India** 24(3); 1987; 107-110

Fruits of Marsh grapefruit (**Citrus paradisi Macf.**) were stored at 1.1 C (34 F) for 17 days as a quarantine treatment for disinfesting the Carribean fruit fly. Continuous storage at 1.1 C resulted in chilling injury and to overcome this a pretreatment conditioning at 15.5 C for 1 wk before storing at 1.1 C for 17 days was tried. It was observed that the usual time required for getting the pulp temp. of 1.1 C with the preconditioned fruit was 28 h compared to 48 h with the non preconditioned fruits. Fruit conditioned at 15.5 C for 1 wk before cold treatment developed 7.3% 'slight chilling injury' and 6.2% decay. Without conditioning 'slight chilling injury' was 30.3% and decay was 15.0%. External fruit colour was not affected by preconditioning treatment. The fruit treated at 1.1 C for 17 days were subsequently stored for 3 wk at 21.2 C, when the flavour was found to be acceptable with cold treated fruit irrespective of preconditioning. Fruit stored continuously at 21.1 C without cold treatment maintained the ascorbic acid level compared to cold treated fruits. KAR

Grapes

2246 Jaworski (AW) and Lee (CY). Fractionation of HPLC determination of grape phenolics. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 257-259

An improved analytical method was developed for the detn. of phenolic compounds in grapes. Phenolic compounds were fractionated into acidic and neutral groups by passing deproteinated grape juice through a preconditioned C18 SEP-PAK cartridge, and then the fractions were sequentially injected into a HPLC column. The separation was made on a C18 Radial-PAK column using 5% acetic acid for acidic phenolics and 40% acetonitrile for neutral phenolics. This fractionation technqiue showed a high recovery and resolution, and it was effective in quantitation of major phenolic compounds in grapes. AS

Kiwifruits

2247 Hang (YD), Luh (BS) and Woodams (EE). Microbial production of citric acid by solid state fermentation of Kiwifruit peel. **Journal of Food Science** 52(1); 1987; 226-227

Method has been developed for the production of citric acid from Kiwifruit peel by a solid state fermentation using **Aspergillus niger** NRRL 567. In the presence of 2% methanol at 30 C 100 g citric acid was produced per kg kiwifruit peel in 4 days. The yield was reported to be more than 60% on the basis of fermentable sugar consumed. Moisture content of the peel had a profound influence on the production of citric acid and the effect of methanol was more pronounced at higher moisture levels. It has been noticed that fruit processing solid residues can serve as a substrate for the production of citric acid by **A. niger** in solid state fermentation. NGKR

Mangoes

2248 Gunjal (BB), Waghmare (NJ) and Molwane (SD). Viscometric behaviour of pulp, juice and nectar of totapuri mango. **Indian Food Packer** 41(3); 1987; 7-13

Viscometric characteristics of pulp, juice and nectar of Totapuri var. of mango was studied at 40-80 C and spindle speeds of 0.5-50 r.p.m. using Brookfield viscometer. Viscosity of pulp, juice and nectar decreased with increase in spindle speed and temp., the decrease being 1.92-1.70, 1.65-1.24 and 1.41-1.30 times resp. than the original viscosity. The effect of spindle speed was more than the effect of temp. on viscosity. The consistency coefficient values for pulp, juice and nectar were 245.90-150.80, 8.56-6.64 and 1.48-1.11 dynes-sec^n /cm^2 resp. over the temp. range of 40-80 C. Consistency coeff. decreased with increasing temp., where temp. did not show effect on flow behaviour index. The apparent viscosity was negatively correlated to the spindle speed. Highly significant positive correlation was observed between consistency coeff. and inverse absolute temp. AS

2249 Prabha (TN), Veena (BA) and Patwardhan (MV). Metabolism of organic acids in modified atmosphere stored ripening mangoes **(Mangifera indica)**. **Journal of Food Science and Technology, India 24(3); 1987;** 111-115

^{14}C succinate, aspartate, citrate, acetate and malate were used to study the ripening behaviour of mango fruits kept under self buit carbon dioxide atmosphere. Among the organic acids studied, citrate metabolism was totally affected as 98% of the label remained in the organic acid fraction and only less than 2% was incorporated into carbon dioxide as against 36% of the ^{14}C citrate incorporation into carbon dioxide in normally ripened fruits. The metabolism of succinate and malate was affected in fruits kept under modified atmosphere (MA) of 7 days. It, however, picked up when the fruits were transferred to ambient conditioning for ripening. ^{14}C aspartate distribution into various fractions showed some deviation from the control fruits especially at the ripe stage. Acetate utilization was not disturbed in the experimental fruits as could be seen by its distribution pattern in carbon dioxide, amino acids, organic acids, and sugars. In general, except for citrate utilization, the metabolism of fruits stored for 5 days in MA did not deviate much from the control fruits unlike the fruits stored for 7 and 13 days under MA. AS

2250 Sreenath (HK), Nanjundaswamy (AM) and Sreekantiah (KR). Effect of various cellulases and pectinases on viscosity reduction of mango pulp. **Journal of Food Science 52(1)**; 1987; 230-231

The optimum enzymic treatment of mango pulp to obtain a product with low viscosity and low pulp content has been investigated as microbial cellulases and pectinases from various sources exhibited different degrees of activity when employed to reduce the viscosity of mango pulp. It has been found that ultrazym 100 rapidly reduced mango pulp viscosity upto 82% and yielded juices which could be easily filtered or centrifuged. Temp., enzyme concn. and time of reaction seem to influence the liquefaction of pulp by enzymatic treatment. NGKR

2251 Vijay Sethi. Quality characteristics of Chausa mango ripened with calcium carbide for pulp storage. **Indian Food Packer 41(3)**; 1983; 14-18

Chausa var. mango was wrapped in newspaper and treated with calcium carbide (1 g/kg) for 6 days and ripened at ropm temp. (22-34 C, RH 65-79). The control untreated fruits took 11.5 days whereas the treated fruits took 6 days for ripening which is indicated by brighter and uniform peel colour. Soluble solids content did not vary from the untreated fruit but vitamin C content lowered and titratable acidity and total carotenoids increased in treated fruit. The overall flavour scoring evaluated by Hedonic scale was slightly higher in treated fruits. Six var. of mango were also ripened by calcium carbide treatment and their sugar acid ratio and total carotenoids were estimated along with the untreated control. Except Dashehari var. others treated var. (Alphonso, Baneshan, Totapuri, Langra, Chausa and Amrapali) showed lesser sugar acid ratio than the control whereas the total carotenoids was increased in Dashehari and Chausa by calcium carbide treatment. KAR

Oranges

2252 Krishnaiah (J), Laxmikanta Reddy (S), Thirupathaiah (V) and Bhal Chandra Dave. Decay control of oranges by fruit coatings. **Science and Culture** 53(4); 1987; 121-122

Decco commercial waxes of food-grade (Decco-Lustr-DL-202, Fruit and Vegetable Kleen-FVK-241, DL-250 and DL-261) were applied at concn. of 0.01, 0.02 and 0.04 ml/100 g fruit. Uniform and blemishless fruits were allowed 5 days at room temp.(25 - 35 C) prior to surface sterilisation (2 min dip in 0.1% sodium hypochlorite solution at pH 6.5 followed by two washings in sterilised water) and subsequent inoculation with spore suspension (500 spores/ml) of different fungi by pin prick method. Both coated and uncoated (controls) fruits were stored at room temp. (25-35 C) upto 20 days and were observed for fungal decay. Results showed that inoculated fruits that were coated did not show any decay upto 20 days and then started to decay slowly. In controls without coating the decay appeared within 10 days and were spoiled after 20 days. The coatings were very effective at higher concn. (0.02 and 0.04 ml/100 kg). DL-202 was effective against black rot of **A. niger** and **A. citri**. FVK-241 and DL-250 were efficient against anthracnose caused by **C. gloeosporiodies**. DL-250 controlled white spots caused by **F. oxysporum**. DL-202 and DL-261 also controlled the rot caused by **R. solani**. MVG

Pears

2253 Bal (JS), Sohan Singh and Sandhu (SS). Quantitative variations in some metabolites in the different parts of two varieties of pear fruits. **Journal of Food Science and Technology, India** 24(3); 1987; 144-145

Changes in soluble solids, reducing and total sugars, acidity, vitamin C and total phenolics in five regions, upper, middle and lower regions of the receptacle, the stem end and calyx end in Patharnakh (**Pyrus pyrifolia** (Burm) Naleai) and LeConte (**Pyrus pyrifolia** x **Pyrus communis**) cv. were determined. The soluble solids in Patharnakh pear were highest in calyx end and upper receptacles and min. in the lower receptacle. In LeConte soluble solids were more at the calyx end than at the stem end. Acidity was max. in the lower receptacle (0.32%) and increased progressively towards the upper receptacle while the total phenolics were significantly higher in the stem end and least in the lower receptacle region. Upper receptacle had the highest brix acid ratio in both the cv.; vitamin C was highest in the middle receptacle (2.54 mg/100 g) in Patharnakh and in LeConte (2.49 mg/100 g);' calyx end contained the lowest amount of vitamin C in both the cv. The highest levels of reducing and total sugars in both the cv. were found in the upper receptacle and their levels decreased towards the centre of the fruit. KAR

Strawberries

2254 Roos (YH). Effect of moisture on the thermal behaviour of strawberries studied using differential scanning calorimetry. **Journal of Food Science** 52(1); 1987; 146-149

The thermal behaviour of a freeze dried natural carbohydrate material was shown to be strongly moisture dependent. The differential scanning calorimetry was used to determine the thermal transitions in fresh and freeze dried strawberries and the moisture dependence of these transitions. The freeze dried strawberry samples had a glass transition at 30-60 C and the melting endotherm of the dried product was similar to that for freeze dried sugars. Ice was found to melt at a moisture content of 21.4% or above. The melting of ice in strawberries was similar to that in sugar solutions and fruit juices. NGKR

CONFECTIONERY, STARCH AND SUGAR

Confectionery

Chocolates

2255 Serra (MdeS), Escobar (MDF), Bosch (EP) and Perez (FF). Study of the microbiological contamination of cacao derived products. **Anales de Bromatologia** 37(2); 1985; 341-349 (Es).

In the present work we have studied the microbiological contamination of chocolates, chocolate creams and instantaneous dissolving powdered cacaos, carrying out in each studied sample the following detn.: mesophilic, thermophilic and proteolytic microorganisms, sporeforming aerobies, enterobacteria, coliforms, enterococci, **B. cereus**, sulphite reducing **Clostridium**, molds and yeasts. It has been also investigated the presence of **Salmonella** sp., **E. coli** and **S. aureus**. The Aerobic Plate count of mesophilic bacteria ranged from 10^1 to 10^4 ufc/g., The counts of enterobacteria, coliforms and enterococci were lower than 100, 10 and 240 NMP/g respectively. The predominant flora was made up of mesophilic facultative thermophilic sporeforming rods. **E. cloacae** and **E. agglomerans** were the most frequently isolated Enterobacteriaceae. **S. faecium** was the **Streptococcus** with the greatest frequency of appearance. The investigation of **Salmonella** sp. and **S. aureus** were negative in all the studied samples. **B. cereus** was isolated in a 15% of the chocolates and chocolate creams. AS

Starch

2256 Berry (CS). Resistant starch: Formation and measurement of starch that survives exhaustive digestion with amylolytic enzymes during the determination of dietary fibre. **Journal of Cereal Science** 4(4); 1986; 301-314

Three factors that influence the yield of resistant starch (RS) after heat processing of cereal and potato have been identified i.e. amylose content, processing temp. and water content. Higher yields of RS (20-34%) were obtained from amylomaize starches, either raw or processed, and from amylopectin starches (32-46% RS) after incubation with pullulanase followed by heat processing. In contrast, the lowest yields of RS (0.2-4.2%) were obtained from amylopectin starches with or without heat processing. RS yields from wheat starch were affected primarily by processing temp. reaching levels of 9% in a single cycle of autoclaving at 130 C with excess water and subsequent cooling; higher levels (about 15%) were obtained after 5 repeated cycles of autoclaving and cooling. A similar increase in yields of RS in dilute (1%) starch suspensions subjected to repeated cycle of heating upto 100 C and subsequent cooling and storage. The time of storage after gelatinisation was important in only these dilute samples. Levels of RS freshly prepared concentrated starch gels (typically 57-67% water) or in white bread did not alter significantly after storage. MVG

BAKERY PRODUCTS

Bread

2257 Barber (S), Martinez-Anaya (MA), Baguena (R) and Torner (MJ). Microflora of the sour dough of wheat flour bread. IV. Functional properties of microorganisms isolated from commercial wheat flour sour doughs. **Revista de Agroquimica y Tecnologia de Alimentos** 27(1); 1987; 107-119 (Es).

The functional properties in wheat flour doughs of yeasts - **Sacch. cerevisiae** and **Hansenula subpelliculosa** - and lactobacilli - **L. brevis**, **L. plantarum** var. **plantarum** and a non-identified homofermentative lactobacillus - isolated from commercial wheat sour doughs have been studied. Differences in gassing power among pure strains of **Sacch. cerevisiae** were not significant (355 ml carbon dioxide/100 g dough 4 h). **H. subpelliculosa** gave less gas (165 ml/100 g dough 4 h.). Changes in pH and total titratable acidity during 6 h fermentation were small. Lactobacilli strains gave variable amounts of gas (between 5 and 132 ml/100 g dough 6 h) in doughs inoculated with 2.10 cells/100 g flour. Generally, activity increased after the first 6 h period, all doughs changing from pH 4.0-5.7 (6 h) to 3.8-4.0 (24 h) and TTA from 1.0-3.2 (6 h) to 6.4-9.2 (24 h). Total sugar contents of doughs containing yeasts varied from 3.5% (dry basis) after mixing to 2.25% after 3 h, whereas those with lactobacilli did not change. Doughs with yeasts showed differences in spread ratio along 6 h fermentation, but those with lactobacilli did not. AS

2258 Jones (RC). Yeast techniques. **Baking Today** 7(1); 1987; 23-24

Briefly discusses role of yeast in bread production, dried inactive yeasts, yeast extract, flavour properties of yeast, nutritional values and whole dried autolysed yeast. BV

2259 Marston (PE). Dough development for breadmaking under controlled atmospheres. **Journal of Cereal Science** 4(4); 1986; 335-344

The two principal components of air, nitrogen and oxygen, both contribute to the technological processes of breadmaking and to the character of bread through entrainment of air during dough mixing. In the experimental work described, new approaches were made to increase or extend the exploitation of air or its components in breadmaking. This work was done under small-scale, laboratory conditions of dough preparation, but using all ingredients and operations as applied in commercial breadmaking by a rapid or 'no-time' process. The results demonstrate some possibilities for lessening dependence on other additives by controlling atm. above dough during mixing. Blown air and, more effectively, an oxygen-enriched atmosphere in contact with dough during mixing hastened maturing and improved the resultant bread. Rapid dough maturation was achieved with ascorbic acid as the only other improver present, and this enhanced oxidation substituted in most respects for potassium bromate, which is widely used in conjunction with ascorbic acid in rapid breadmaking processes. AS

2260 Schieberle (P) and Grosch (W). Quantitative analysis of aroma compounds in wheat and rye bread crusts using a stable isotope dilution assay. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 252-257

A stable isotope dilution assay was developed for the quantitative analysis of acetylpyrazine, 2-methyl-3-ethylpyrazine, 5-methyl-5H-cyclopenta[b]pyrazine, and 2-acetyl-1-pyrroline in bread crusts. Model experiments showed that these compounds, which contribute significantly to the crust flavour, can be determined with high sensitivity and accuracy. The method revealed that the levels of the three pyrazines lie in similar concn. ranges in the wheat and rye crusts. In contrast, 2-acetyl-1-pyrroline appeared at an approx. 20-fold higher concn. in wheat crust than in rye. Comparison of two different processes for rye bread revealed that the level of the four compounds was twice as high in the three-stage sour dough than in the one-stage process. AS

Cakes

2261 Sato (H), Matsumura (T) and Shibukawa (S). Apparent heat transfer in a forced convection oven and properties of baked food. **Journal of Food Science** 52(1); 1987; 185-188

The heating performance of forced convection oven could be expressed by the apparent heat transfer coeff. defined by the air temp. and surface temp. of foods and the relationship of the baked sponge cake properties with both air velocity and temp. have been analysed in this study. The effects of these parameters on sponge cakes baked in the forced convection oven were observed in these studies. NGKR

Dough

2262 Frolich (W), Brakenberg (T) and Asp (N-G). Enzymic degradation of phytate (myo-inositol hexaphosphate) in whole grain flour suspension and dough. A comparison between sup NMR spectroscopy and a ferric ion method. **Journal of Cereal Science** 4(4); 1986; 325-334

The enzymatic hydrolysis of inositol hexaphosphate showed a very distinct pattern when the products were analysed using ^{31}P NMR spectroscopy. It seems likely that the hydrolysis proceeds in a stepwise manner and that each of the lower inositol phosphates is the dominant species present at different stages during the hydrolysis. The rate of hydrolysis of the different inositol phosphates decreases with decreasing degree of phosphorylation. In contrast to the ^{31}P NMR method, which distinguished inositol hexaphosphate from the intermediate hydrolysis products, the ferric ion method is not specific. Some of the lower inositol phosphates and may be even inorganic phosphate appears to co-precipitate with phytate in this method which, thus, over estimates the phytate content. AS

Tortillas

2263 Jimenez-Aparicio (A), Arenas-Ocampo (ML) and Gallardo-Navarro (Y). Texture and sensorial quality of "tortillas" elaborated with different corn-sorghum mixtures. **Revista de Agroquimica y Tecnologia de Alimentos** 27(1); 1987; 67-74 (Es).

In "tortillas" elaborated with different corn-sorghum mixtures, the changes caused by the addition of sorghum on texture, tannin content and sensorial quality were studied. Two Mexican sorghum var. were assayed: Purepecha (i) and RB-3006 (ii). A previous alkaline-thermal treatment reduced sufficiently the tannin content in (i) but not in (ii). The texture profile in the dough showed that the starch gelatinization was adequate in (i) but not in (ii). There were no significant differences in sensorial acceptance between 100% corn "tortilla" and 20% (i)-corn mixture. The "tortillas" elaborated with (ii)-corn mixtures showed lower sensorial qualifications that the ones elaborated with the same proportions of (i). It can be concluded that, if the alkaline-thermal treatment of sorghum is not sufficient, the acceptability of the "tortillas" will be low. AS

MILK AND DAIRY PRODUCTS

2264 Dixon (BD). New formula for the calculation of fat losses in churning. **Australian Journal of Dairy Technology** 41(1); 1986; 15-18

The author has arrived at a new formula which was derived from experience with 48 commercial churnings over a season in several different butter factories for calculating fat losses in churning. It is applicable to continuous or batch churning. KAR

2265 Ennis (BM) and Harper (WJ). Properties of spray-dried lactalbumin treated with a protease. **New Zealand Journal of Dairy Science and Technology** 21(3); 1986; 205-216

2266 Gupta (SK), Patil (GR) and Patel (AA). Fabricated dairy products. **Indian Dairyman** 39(5); 1987; 199-208

The fabricated foods covered in this review include margarine; spreads; imitation cheese; coffee/tea whiteners; ready to reconstitute products like coffee complete and tea complete; soy yoghurt and lassi; baby foods; weaning foods; ice cream analogues and a few milk like products are discussed. MVG

Milk

2267 Barbera Saez (R), Peralta (IB) and Rovira (RF). Cobalt and vitamin B_{12} contents of infant formulae milk. **Anales de Bromatologia** 37(2); 1985; 253-259 (Es).

The cobalt and vitamin B12 contents of 17 infant formulas milk has been determined. The cobalt has been determined by using Atomic Absorption Spectrometry after chelating and solvent extraction and the vitamin B12 by a microbiological method with **Lactobacillus leichmanii**. It was not possible to find a relationship between the cobalt and the vitamin B12 contents. The results found for the latter are higher than the mentioned in the label. AS

2268 Bradshaw (JG), Peeler (JT), Corwin (JJ), Barnett (JE) and Twedt (RM). Thermal resistance of disease-associated **Salmonella typhimurium** in milk. **Journal of Food Protection** 50(2); 1987; 95-96

The thermal resistance of **Salmonella typhimurium** cultures that had been associated with a major milk borne outbreak of salmonellosis was determined in raw whole milk. Thirteen patient stool isolates and 24 implicated pasteurized milk isolates at concn. of 1×10^5/ml were screened for heat resistance at 51.8 C. A representative milk strain was heated in replicate at four temp. from 51.8 to 68.3 C. The ZD value was calculated to be 5.3 C. Mean D-value estimates at 51.8 C were 24.0 and 22.8 min for patient and milk isolates, resp. Extrapolated $D_{71.7}$ values were 0.24 and 0.232 s, and did not differ significantly (Alpha = 0.05). These isolates would not survive proper pasteurization. AS

2269 Dominguez (L), Blanco (JL Gomez-Lucia (E), Rodriguez (EF), Suarez (G). Determination of aflatoxin M_1 in milk and milk products contaminated at low levels. Journal of the Association of Official Analytical Chemists 70(3); 1987; 470-472

A new method is described for the detn. of aflatoxin M1 in milk and dairy products with the main characteristic of using an extraction containing an alkaline solution. Lipids are removed by centrifuging at low temp. and aflatoxin are then extracted with chloroform. The method has two options. Technique II (detection limit 0.02 p.p.b) requires cleanup on a chromatographic column whereas this is not necessary for technique 1 (detection limit 1 p.p.b). The recovery rate in both technique is > 92.8% in milk and yoghurt. This method can also be used for other aflatoxins. MVG

2270 Dommett (TW), Baseby (LJ) and Swain (AJ). Effects of storage conditions in a final factory on raw milk microbiological quality. Australian Journal of Dairy Technology 41(1); 1986; 23-27

The present report records investigation on microbial populations during silo or vat storage at the city factory as the raw milk has to conform to prescribed microbiological standards which include a total plate count of < 150000/mL for all raw milk, < 50000/mL for farm milk meant for market and an advisory standard of < 50000/mL for all other farm raw milk. The psychrotroph growth patterns were similar whether milk was selected according to intial total count or whether milk was stored in silos or vats. The total count depends on the temp. and time of storage which ultimately controls the final quality of milk, these conditions have to be adjusted depending on the type of storage in order to comply with the requirement of total count of < 15000/mL standard. NGKR

2271 Garnot (P) and Molle (D). Heat-stability of milk-clotting enzymes in conditions encountered in Swiss cheese making. Journal of Food Science 52(1); 1987; 75-77

This study is to investigate the heat stability of different milk clotting enzymes in whey and in milk. It is seen that chymosin is inactivated in gelled milk at pH 6.50 and 53 C. Protein and calcium concn. affect the resistance to heat treatment and pH appears to be the most important parameter for heat stability. NGKR

2272 Lintner (TJ), Lange (AL), Heald (CW) and Eberhart (RJ). Preparation and use of somatic cell count samples (SCCS) for comparison of milk somatic cell counting methods. Journal of Food Protection 50(2); 1987; 132-135

2273 Magdoub (MN), Naguib (K), El-Samragy (YA) and Mahmoud (BA). Efficacy of iodophor and sodium hypochlorite used in dairy farm on total and lactic acid bacterial counts in raw milk. Egyptian Journal of Food Science 15(1); 1987; 27-35

Washing of udders of animals with iodophor (0.5, 0.75 and 1.0%) and sodium hypochlorite (3.0, 4.0 and 5.0%), utensils and hands of milkers' hands significantly affected the numbers of psychotrophs, mesophiles, thermophiles, thermodurics and lactic acid bacteria in raw buffalo milk. Iodophor preferentially affected thermodurics. An iodophor sanitising technique was recommended for obtaining clean, high quality raw milk. MVG

2274 Mohamed Habibulla Khan (M) and Natarajan (N). Biochemical changes in milk by Bacillus cereus cells. Madras Agricultural Journal 73(3); 1986; 166-169

The trials were conducted by inoculating **Bacillus cereus** spores in low count milk and holding at 37 C and subjected to (i) pasteurisation, (ii) pasteurisation and boiling, and (iii) boiling of milk. The spore cells of **B. cereus** grew in pasteurised milk upto 2 h and thereafter formed spores after 8 h. The keeping quality of pasteurised milk and boiled milk was 8 h whereas in pasteurised and boiled milk it was only 6 h. The rate of proteolysis was found to be higher in pasteurised and boiled milk. There was not much of change in the lipolysis in the treatments. AS

2275 Ohmiya (K), Fukami (K), Shimizu (S) and Gekko (K). Milk curdling by rennet under high pressure. **Journal of Food Science** 52(1); 1987; 84-87

The effect of high pressure on milk curd formation using rennet was studied with milk prepared out of 20% skim milk powder on 0.02 M calcium chloride. The extent of proteolysis and curd tension were measured after treating with rennet at 35 C for differnt periods and high pressures. It was seen that rennet and milk protein were not denatured by high pressure and milk curdling was not affected by compression and the secondary phase reaction was delayed under high pressure and the tertiary phase reaction accelerated. NGKR

2276 Platt (SR), Nadeau (DB), Gifford (SR) and Clydesdale (FM). Protective effect of milk on mineral precipitation by Na phytate. **Journal of Food Science** 52(1); 1987; 240-241

The effects of phytic acid on the solubility and therefore the potential bioavailability of endogenous calcium in milk with its effect on inorganic calcium solubility in a model system alone and in the presence of added Fe and Zn have been studied. It has been seen that the addition of sodium phytate caused a significant precipitation of each of these minerals. It is suggested therefore that milk exerts a protective effect on the phytate induced precipitation of these minerals and thus their potential bioavailability. NGKR

2277 Sen (DC) and Gupta (SK). Effect of freezing and thawing on the sensory qualities of dairy products. **Indian Dairyman** 39(5); 1987; 231-234

Effect of freezing and thawing on sensory qualities have been considered for the following milk and milk products; fluid milk, frozen conc. milk, cream, whipped cream, butter, evaporated milk, sweetened condensed milk, cheese, ripened cheese, fresh curd cheese, processed cheese, paneer, yoghurt, and icecream. MVG

2278 Singh (RRB) and Patil (GR). Physico-chemical and sensory changes during processing and storage of UHT milk. **Indian Dairyman** 39(5); 1987; 209-214

The effect of ultra-high-temp.(UHT) processing of milk on colour and flavour of milk, along with other changes like viscosity, sedimentation, pH value, rennet clotting time, and freezing point have been reviewed briefly. MVG

2279 Thompkinson (DK) and Mathur (BN). Modification of bovine milk lipid for infant feeding. **Indian Dairyman** 39(5); 1987; 239-241

This brief review covers aspects like bovine milk modifiers; nutritional implications of addition of oil for modification, physiological response of infants; and infant formulations containing polyunsaturated fatty acids. MVG

2280 Toyosaki (T), Yamamoto (A) and Mineshita (T). Partial purification of an antioxidizing component in raw cow milk. **Journal of Food Science** 52(1); 1987; 88-90

An antioxidising component in a serum of cow milk has been isolated and identified and found suitable as a food additive. This component may be a protein found riboflavin and its antioxidising effect decreased with irradiation accompanied by a parallel decrease in the riboflavin content. By gel filtration the mol. wt. of this compound was estimated to be 38000. NGKR

Milk products

Butter

2281 Turull (MV). Microbiological quality of Spanish butter and margarine. **Anales de Bromatologia** 37(2); 1985; 307-313 (Es).

Channa

2282 Nusrath Nasir , Narayanaswamy (M), Sandhu (JS) and Nagaraja (KV). Lactose content - a factor to distinguish channa and khoa based sweets. **Journal of Food Science and Technology, India** 24(3); 1987; 145-146

Lactose content was determined in sweets based on **channa** (**Rasagolla, Rasbhari**, Apple,. **Rajbhog**) **khoa** (**Burfi, Pedha**) and **khoa-channa** mixed (Anarkali, Champakali and Sandwich) to distinguish channa and **khoa** based sweets. True lactose was absent in **channa** based sweets and ranged from between 5.1 and 11.9% in **khoa** based sweets and 2.6 and 5.0% in **khoa-channa** mixed preparation. KAR

Cheese

2283 Abraham Vema and Anand (SR). Biochemical changes associated with ripening of Cheddar cheese from buffalo milk: Ripening changes at 8 C. **Journal of Food Science and Technology, India** 24(3); 1987; 121-126

Buffalo milk Cheddar cheese was ripened at 8 plus or minus 1 Degree C for 9 months and changes in moisture content, pH, titratable acidity, % lactic acid, lipase activity, partial glycerides of neutral lipids and free fatty acids composition were determined in alternate months. The changes observed in moisture content, titratable acidity, pH and lactic acid formation were similar to those observed in cow milk Cheddar cheese prepared and ripened under identical conditions. Per cent decrease in total glycerides and triglycerides in buffalo milk cheese was 1.02 and 4.11 compared to 1.66 and 4.36 resp. for cow milk cheese. Soluble N (mg tyrosine/g cheese) was low in buffalo milk cheese than in cow milk cheese. The active-SH group at 6 months of ripening was 20 μg cysteine - HCl/g cheese for buffalo milk cheese and 32 ug cysteine - HCl/g cheese for cow milk cheese. At 9 months of ripening, 206.6 μg FFA/g were released in buffalo milk cheese compared to 280.7 μg FFA/g in cow milk cheese. Max. proteinase activity in cow milk cheese (1.5 hide powder azure units/g protein) developed in 6 months which was 1.5 time that in buffalo milk cheese. Buffalo milk cheese had a lower lipase activity than cow milk cheese. Up to 5 months lipase activity increased and afterwards it decreased in both cow and buffalo milk cheese. Typical cheddar flavour in cow's milk cheese was evident by 6 months of ripening while buffalo milk cheese had developed mild flavour at this time and desired flavour at 7 months. Body and texture of buffalo milk cheese were not satisfactory. KAR

2284 Abraham Vema and Anand (SR). Biochemical changes associated with ripening of Cheddar cheese from buffalo milk: The lipid composition of buffalo milk and zero-day curd. **Journal of Food Science and Technology, India** 24(3); 1987; 116-120

Buffalo milk was curdled by presalting method using a starter culture 'Y' (**S. lactis + S. cremoris + S. lactis** sub sp. **diacetylactis**). Analysis of 0-day buffalo cheese showed (in %) protein 23.25, fat 29.50, salt 1.90, titratable acidity (% lactic acid) 0.58, lactic acid 0.28 and pH 5.25. The lipid of buffalo milk and the 0-day cheese comprised > 98% neutral lipids and < 1% phospholipids. Neutral lipids consisted chiefly of triglycerides (93.91%) with smaller amounts of di- and monoglycerides. The major component phospholipids were phosphatidyl choline, phosphatidyl ethanolamine, and sphingomyelin with small amounts of phosphatidyl serine and phosphatidyl inositol. Palmitic acid was the major saturated fatty acid in total and neutral lipids and free fatty acids (FFA) of milk cheese; the unsaturated fatty acids detected in the total and neutral lipids of milk and 0-day cheese were 14:1, 16:1, 18:1, 18:2, and 18:3. In FFA, oleic acid was the only unsaturated fatty acid present. Lipase activity in buffalo milk was found to be 1.25 µeq. FFA/ml of milk/ h and it got inactivated at the pasteurisation temp. KAR

2285 Aston (JW) and Creamer (LK). Contribution of the components of the water-soluble fraction to the flavour of Cheddar cheese. **New Zealand Journal of Dairy Science and Technology** 21(3); 1986; 229-248

High performance liquid chromatography was used to study the components of the water-soluble fraction (WSF) of cheddar cheese. It was confirmed that this fraction contributed most to the flavour intensity of the cheese and a simplified method for its extraction was developed. The results suggest that the free amino acids make a significant contribution to the flavour of the WSF but other material, presumably peptides, is necessary for full flavour. KAR

2286 Bijl (JP), Van Peteghem (CH) and Dekeyser (DA). Fluorimetric determination of aflatoxin M_1 in cheese. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 472-475

A Fluorimetric detn. method for aflatoxin M_1 is proposed. The cheese sample is ground and extracted with acetone-water (3+1). The extract is cleaned up on a silica cartrigde and final analysis is performed by 2-dimensional thin layer chromatography combined with fluorodensitometry or by reverse phase liquid chromatography with fluoresence detection. MVG

2287 Garcia-Roche (MO), Gonzalez (E) and Vidaud (Z). Variation of tyramine content of Gouda and Svecia cheeses during ripening. **Revista de Agroquimica y Tecnologia de Alimentos** 27(1); 1987; 75-78 (Es).

The variation of tyramine content during ripening of Gouda and Svecia types of cheese was investigated. An increasing and significant ($P < 0.05$) variation of the tyramine levels during the 3 months ripening period was noticed. For Gouda cheese the av. content varied from 29.9 to 147.3 p.p.m and for Svecia cheese from 13.1 to 104.9 p.p.m. BV

2288 Khorshied (MA), Metwally (MM), Abd El-Gawad (IA) and El-Sayed (MM). Ultrafiltration process of cheese whey. **Egyptian Journal of Food Science** 15(1); 1987; 75-78

2289 Lin (JCC) and Jeon (IJ). Effects of commercial food grade enzymes on free fatty acid profiles in granular Cheddar cheese. **Journal of Food Science** 52(1); 1987; 78-83

Commercial food grade enzymes (Neutrase, calf lipase and Natur Age) were added to cheese at various levels and ripened at 7 Degree C and 13 C. Gas chromatographic analysis showed that free fatty acid (FFA) production increased significantly with lipase and high level Natur Age. These observations suggested that further efforts on combinations of time, ripening temp. and enzyme concn. would be needed to produce large concn. of short chain FFA which might be a key factor for developing an accelerated cheese ripening process applicable in the diary industry. Total concn. of C_4 and C_6 may be a good indicator of flavour development during cheese ripening. NGKR

2290 Magdoub (MNI), Hammad (YA), El-Samragy (YA) and Fayed (EO). Effect of different types of gas inhibiting salts on the chemical, bacteriological and organoleptic properties of domiati cheese during pickling period. **Egyptian Journal of Food Science** 15(1); 1987; 51-63

2291 Mehanna (NM), Ewais (SM), Mehanna (AS) and Rashed (MA). A study on the use of food grade proteinase (Al-calase) for accelerating cheese ripening, 2-Domiati cheese. **Egyptian Journal of Food Science** 15(1); 1987; 105-110

Effect of alcalase 0.6L enzyme as a commercial proteinase on the yield, chemical and organoleptic changes in Domiati cheese throughout the pickling period was studied. MVG

2292 Rafecas (M), Boatella (J) and Torre (MCdela). Determination and evolution of free and total fatty acids during maturation of Parmesan cheese. **Anales de Bromatologia** 37(2); 1985; 229-241 (Es).

2293 Rafecas (M), Boatella (J) and Torre (MCdela). Evolution of trans-2-hexenol in a type Parmesan cheese. **Anales de Bromatologia** 37(2); 1985; 243-251 (Es).

Using the technique of adsorption in activated charcoal of head-space and GC/MS analysis, trans-2-hexenol in Parmesan cheese made in Catalonia is determined. BV

Quarg

2294 Hayes (G). A question of quarg. **Food Manufacture** 62(3); 1987; 55, 57

Briefly describes the manufacture and marketing aspect of quarg. BV

Desserts

2295 Warburton (DW), Peterkin (PI), Jarvis (GA), Weiss (KF) and Riedel (G). Microbiological quality of dry dessert mixes sold in Canada. **Journal of Food Protection** 50(2); 1987; 136-140

A study done in 1977-1978, assessed the bacteriological quality of five types of dry desserts including starch-, gelatin- and rennet-based products. One hundred and ninety-seven lots were randomly selected across Canada and analyzed for aerobic colony count, aerobic sporeformers, Bacillus cereus, coliforms, Escherichia coli, Staphylococcus aureus and Salmonella. Microbiological and practical consideration do not warrant the establishment of standards or guidelines for such products at this time. AS

Ghee

2296 Arora (KL) and Singh (S). Effect of blending goat and buffalo milk on shelf-life of ghee. **Journal of Food Science and Technology, India** 24(3); 1987; 126-131

Ghee (dehydrated butter oil) was prepared from goat and buffalo milk separately as also after mixing in 3:1 and 1:1 ratio by desi (local), creamery butter (CB) and direct cream (DC) methods. The flavour, body, texture, colour, acidity, peroxide value (PV) and carbonyl content of the blended ghee were determined in alternate months during the storage of desi ghee for 6 months and CB and DC ghee for 10 months. The ghee made by desi method were 'fair' after 6 months. Ghee made by CB and DC methods were fair up to 10 months. Buffalo ghee and its blends tended to have slightly better shelf life than goat ghee regardless of method of manufacture. The body and texture of all fresh ghee were 'good' irrespective of the method of manufacture. All the samples were rated as fair at the end of storage with respect to body and texture. The acidity of fresh ghee made from desi method was 0.23-0.38%, the highest being in goat ghee and lowest in buffalo ghee. Acidity increased during storage of all types of ghee; max. increase was in desi ghee followed by ghee prepared by DC and CB methods. The PV of ghee made by desi method ranged from 0.62 to 0.68 the lowest in goat ghee and highest in buffalo ghee. The PV increased during storage, the final value being 1.01 to 1.28 after 6 months. The PV of fresh ghee made by DC method were significantly higher than those made by CB or desi methods. The carbonyl content of fresh ghee ranged from 3.81 to 5.39 µ mol/g; the lowest being in goat and highest in buffalo ghee. The rate of increase in carbonyl content of goat ghee was faster than that of buffalo ghee, both prepared by desi and CB methods, whereas reverse was the case in DC method. Rate of increase of carbonyl content of all types of ghee prepared by desi method was comparatively faster than that of ghee prepared by CB and DC methods. KAR

2297 Chauhan (P) and Wadhawa (BK). Comparative evaluation of ghee in tin and polyethylene packages during storage. **Journal of Food Processing and Preservation** 11(1); 1987; 25-30

Ghee samples were packaged in tin and polyethylene packages and stored at 37 C for 195 days. Samples were analyzed every other wk for free fatty acids (FFA) level, peroxide value (PV), total carbonyl content (TCC), moisture content (MC) and flavour score (FS). Ghee packaged in tin had higher average FFA, PV, TCC and MC as compared to ghee packaged in polyethylene. In contrast to results of various chemical parameters, ghee in tin packages had a higher average level of FS as compared to ghee packaged in polyethylene. However, differences in FS became almost negligible at the end of the storage period. Though a strong recommendation cannot be made, yet keeping in view the results of chemical parameters, negligible flavour differences at the end of the storage period, involvement of low cost and easy handling, polyethylene packages should be preferred to tin packages for storage of ghee. AS

Ice cream

2298 Mahran (GA), El-Alamy (HA), El-Bagoury (EH) and Sayed (AF). Effect of storage temperature of milk fat on ice cream quality. **Egyptian Journal of Food Science** 15(1); 1987; 65-73

Milk powders

2299 Kwee (WS), Dommett (TW), Giles (JE), Smith (RAD) and Roberts (R). Microbiological parameters during powdered milk manufacture.2: Relationships and predictability among counts. **Australian Journal of Dairy Technology** 41(1); 1986; 6-8

Relationships among nine microbiological parameters were examined at four stages of production during three different milk drying processes. The thermoduric count of the raw milk used for low-heat or medium-heat powder was the best indicator of total and thermoduric counts at later stages of processing. Because of the narrow range of thermoduric counts in the milk used for medium-heat manufacture, only in low-heat process could the final total count be estimated with sufficient accuracy to be of practical use. In the high-heat process, the thermoduric count of the raw milk was not indicative of total counts in the powder. AS

2300 Kwee (WS Dommett (TW), Giles (JE), Roberts (R), Smith (RAD). Microbiological parameters during powdered milk manufacture.1: Variation between processes and stages. **Australian Journal of Dairy Technology** 41(1); 1986; 3-6

Ten microbiological parameters (total bacteria, thermodurics, spores, thermophiles, psychrotrophs, coliforms, resuscitated coliforms, yeasts, moulds and **Salmonella**) were measured to determine that value as quality indicators in the prodcution of low-, medium- and high-heat powders. Samples were taken before and after preheating and after concn. and drying. With the exception of total bacteria, thermodurics, spore-formers and thermophiles counts were reduced to negligible levels during preheating. The parameters which reflected the effects of changing conditions during manufacture were, in increasing order of sensitivty, total count, thermoduric count and spore count. All three were reduced with time, the rate and extent depending on the process and stage. Although psychrotrophs were dominant in raw milk, thermodurics, dominated in samples from later stages in all three processes. AS

2301 Rogers (WP) and Kieseker (FG). A modified method for the extraction of fat from stored full-cream milk powders. **Australian Journal of Dairy Technology** 41(1); 1986; 31-32

To improve the recovery of fat from stored full cream milk powder the methodology was reviewed. The deemulsification method using a reagent of sodium citrate, sodium salicylate and n-butanol was used as the basis for all fat separation by preliminary dispersion of the powder, solubilisation of the protein and then separation of the fat with suitable solvent of major concern, the recovery of fat from powders is that extraction methods should not influence peroxide values. It was seen that by this pretreatment with sodium borate and a proteolytic enzyme it has resulted in the release of the fat without a significant influence on the peroxide value as full cream milk powders stored at elevated temp. for prolonged periods can be difficult to deemulsify using standard methods. NGKR

Whey

2302 Kim (YA), Chism (GWIII Mangino (ME). Determination of the Beta Lactoglobulin, Alpha-lactalbumin and bovine serum albumin of whey protein concentrates and their relationship to protein functionality. **Journal** of Food Science 52(1); 1987; 124-127

Studies were undertaken to determine the Beta lactoglobulin, Alpha-lactalbumin and bovine serum albumin in a var. of whey protein conc. (WPC) by gel electrophoresis and by reversed phase HPLC and compared the compositional data to the functionality of WPC in model food systems. The results showed that the total protein as determined by HPLC was in good agreement with the soluble protien of the WPC. The Beta-lactoglobulin determined by HPLC was significantly correlated with emulsion capacity, protein solubility, whipped topping over run, gel strength and free sulphhydroxy of the WPC. NGKR

Yoghurt

2303 Salji (JP), Saadi (SR) and Mashhadi (A). Shelf life of plain liquid yoghurt manufactured in Saudi Arabia. Journal of Food Protection 50(2); 1987; 123-126

MEAT AND POULTRY

Meat

2304 Kutnink (MA) and Omaye (ST). Determination of ascorbic acid, erythorbic acid, and uric acid in cured meats by high performance liquid chromatography. Journal of Food Science 52(1); 1987; 53-56

The feasibility of using HPLC method to determine ascorbic acid (AA), erythorbic acid (EA) and uric acid (UA) levels in meats cured with AA or EA to compare the results with those obtained by colorimetric and fluorometric procedures for total ascorbate (AA+EA) has been studied. The results demonstrate the applicability of HPLC to the detn. of AA and EA in meats cured with these substances. In addition the sensitivity of the electrochemical detector allows endogenous AA to be quantified in extracts of EA cured meats. The detn. of EA concn. may be of nutritional interest because this substance has little vitamin activity but is a commmon food additive. NGKR

2305 Li-Chan (E), Nakai (S) and Wood (DF). Muscle protein structure-function relationships and discrimination of functionality by multivariate analysis. Journal of Food Science 52(1); 1987; 31-41

Functional (gel strength, cook-loss, emulsifying, fat and water binding capacities) and physicochemical properties of mince and salt-extractable proteins were analyzed. Factor analysis identified three principal components which accounted for > 75% of data variance and distinguished between mechanically and hand-deboned meat and fish samples. Stepwise discriminant analyses classified samples with good, intermediate and poor functionality. Regression analyses yielded equations to predict functionality from physicochemical properties. Generally, samples with superior thermally induced functionality possessed (1) higher protein, lower fat and pH in the mince; (2) higher solubility and sulfhydryl and lower hydrophobicity in unheated salt-extractable proteins; and (3) greater decrease in solubility and increase in hydrophobicity after heating. AS

2306 Nuckles (RO), Brekke (CJ) and Luedecke (LO). Reduction in pH and fermentation time of meat mixtures containing dry acid whey. Journal of Food Science 52(1); 1987; 238-239

The effect of various concn. of dry acid whey on the pH of ground beef and pork and on fermentation activity of 11 commercial starter cultures added to a beef summer sausage formulation was determined. For every 1% (w/w) addition of dry acid (pH 4.0) whey, a reduction in meat pH of 0.11-0.13 resulted, independent of meat species, initial pH or fat content. Use of 3.5% (w/w) dry acid whey in conjunction with 1% dextrose resulted in a 1-2 h reduction in time required for the summer sausage mixture to reach pH 5.0 compared to a mixture without whey. Dry acid whey as a direct acidulant in fermented sausages could result in a savings of time and energy in manufacturing. AS

2307 Pham (QT). Calculation of bound water in frozen food. **Journal of Food Science** 52(1); 1987; 210-212

This study was made to show how the ratio of bound water fraction to solids content for each type of material (meat, fish, egg, bread or tylose) was found to fall within a relatively narrow range using the widely accepted model of Schwartberg. NGKR

2308 Stermer (RA), Lasater-Smith (M) and Brasington (CF). Ultraviolet radiation - An effective bactericide for fresh meat. **Journal of Food Protection** 50(2); 1987; 108-111

UV irradiation was shown to effectively increase the lag phase of bacteria multiplication until adequate cooling had occurred. MVG

2309 Van Peteghem (CH), Lefevere (MF), Van Haver (GM) and De Leenheer (AP). Quantification of diethylstilbestrol residues in meat samples by gas chromatography-isotope dilution mass spectrometry. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 228-232

A method is described for the quantitative detn. of residues of the synthetic estrogen diethylstilbestrol (DES) in meat at levels as low as 0.1 p.p.b. Samples were enzymatically digested with subtilis in and extracted with diethyl ether. The organic phase was then subjected to a cleanup, consisting of two liquid-liquid partitionings residues of DES in the extract was derivatized to bis(hepta-fluorobutyryl)-DES and assayed by electron-impact mass spectrometry. Quantification was achieved by measuring the intensity ratio of the m/z 660 ion (molecular ion of DES) and the m/z 666 ion (molecular ion of the hexadeuteriated DES analogue). The latter not only served as the internal standard but also monitored the derivatization efficiency and stabilized the **cis/trans** DES isomers ratio. Analytical recovery from meat, as assayed with a H-labeled DES, was about 90%. The method was used to confirm positive radioimmunoassay results. AS

Beef

2310 Allen (DM), Hunt (MC), Luchiari Filho (A), Danler (RJ) and Goll (SJ). Effects of spray chilling and carcass spacing on beef carcass cooler shrink and grade factors. **Journal of Animal Science** 64(1); 1987; 165-170

2311 Cutrufelli (ME), Mageau (RP), Schwab (B) and Johnston (RW). Detection of beef and poultry by serological field screening tests (ORBIT and PROFIT): Collaborative study. **Journal of the Association of Official Analytical Chemists** 70(2); 1987; 230-233

Ten laboratories each analyzed 30 raw meat and raw meat product samples in a collaborative study of the ORBIT (overnight rapid bovine identification test) and PROFIT (poultry rapid overnight field identification test) serological field screening tests for the detection of beef and poultry. Versatility of the tests was shown in the analysis of whole tissue, ground, or emulsified raw meat products. Both tests were demonstrated to be reliable and were capable of detecting adulterants present at the 10% level. The method has been adopted official first action. AS

2312 Hawkins (RR), Davis (GW), Cable (JKJr) and Ramsey (CB). Fragmentation index as an early postmortem predictor of beef tenderness. Journal of Animal Science 64(1); 1987; 171-176

2313 Leod (GM) and Ames (JM). Effect of water on the production of cooked beef aroma compounds. Journal of Food Science 52(1); 1987; 42-45

This study was undertaken to isolate and analyse the aroma compounds from cooked fresh ground beef which had been freeze-dried defatted and then reconstituted before cooking to different water contents. The volatiles were compared with those generated from untreated fresh cooked ground beef. The results showed that aroma compounds isolated from cooked fresh ground beef, freeze dried, defatted and rehydrated to 58% and 17% water respectively were less meaty and contained higher relative concn. of hydrocarbons, ketones, lactones, esters, benzenoids, pyrroles, pyridines and thiazol(in)es (58% water) and of aliphatic ketones, lactones, esters, aliphatic sulphur compounds, pyrroles and pyrazines (17% water) than those obtained from untreated beef. NGKR

2314 Molins (RA), Kraft (AA), Walker (HW), Rust (RE), Olson (DG) and Merkenich (K). Effect of inorganic polyphosphates on ground beef characteristics: Microbiological effects on frozen beef patties. Journal of Food Science 52(1); 1987; 46-49

This present study was undertaken to determine the possible contribution of 0.4% pure phosphates or phosphate blends to the microbiological quality characteristics of frozen beef patties prepared and stored for use similar to that for commercial fast food preparations. The results showed that addition of 0.4% levels of the pure or blended phosphates tested did not significantly reduce numbers of mesophilic, psychrotrophic, lactic acid bacteria in beef. Patties stored at -20 C for upto 90 days. All phosphates studied increased the pH and the soluble orthophosphate content of beef patties. Hydrolysis of the phosphates added to ground beef occurred even during frozen storage at -20 C. NGKR

2315 Molins (RA), Kraft (AA), Walker (HW), Rust (RE), Olson (DG) and Merkenich (K). Effect of inorganic polyphosphates on ground beef characteristics: Some chemical, physical, and sensory effects on frozen beef patties. Journal of Food Science 52(1); 1987; 50-52

Chemical, physical and sensory effects of 0.4% sodium tripolyphosphate, tetrasodium pyrophosphate and three commercial phosphate blends were studied in frozen beef patties over a 90 day storage period at -20 C. It was seen that addition of phosphates significantly increased pH, soluble orthophosphates, colour values and cook yields and characteristics. Phosphate addition did not affect proximate analysis, texture and flavour scores but overall qualities as measured by TBA numbers and cooking yields was improved by all phosphates and these interfered with the distillation TBA test. NGKR

2316 Sikes (A) and Rolle (GE). Effect of a methanol-acetone extract of skim milk fermented by Streptococcus thermophilus on colour, microbial counts, and pH of fresh beef. Journal of Food Protection 50(2); 1987; 127-131

Cattle

Bulls

2317 Paterson (BC), Jones (KW), Gee (DH), Costello (WJ) and Romans (JR). Effects of rapid processing on the chemical and sensory properties of restructured steak made from bull and steer meat. **Journal of Food Science** 52(1); 1987; 28-30

These studies on chicks from young bulls showed that they can be used as a raw material for producing satisfactory restructured steaks. In addition, hot boning used in conjunction with a carcass conditioning period can be successfully incorporated into the processing scheme of restructured beef steaks. NGKR

Pork

2318 Jeremiah (LE). Effects of inherent muscle quality differences upon the palatability and cooking properties of various fresh, cured and processed pork products. **Journal of Food Quality** 9(5); 1986; 279-287

Ham steaks, loin chops, bacon slices, shoulder roasts, and sausage patties fabricated from three muscle quality groups were utilised to evaluate the effects of muscle quality on palatability and cooking properties. The need for research relating porcine muscle quality to sensory qualities and consumer acceptance necessitated the present studies on the evaluation of the effects of inherent muscle quality differences on the tenderness, juiceness, flavour destability, over all palatability cooking losses of various fresh, processed and cured and smoked pork products. 3 groups of carcasses were taken for these studies and the data was statistically analysed. The results show that irrespective of muscle quality pale, soft exudative versus normal versus dark firm dry all pork cuts evaluated were well within the acceptable range in palatability. In addition the results indicated that inherent muscle quality differences were of little relevance to the eating quality of pork. NGKR

2319 Swatland (HJ). Measurement of postmortem changes in pork by high-speed compression hysteresis. **Journal of Animal Science** 64(2); 1987; 444-447

Efforts are being made to develop new methods of measuring postmortem softness of pork. Isolated samples of porcine sternocephalicus muscles were evaluated for postmortem compressbility by a compression and release cycling lasting 2 sec. Samples (about $3\ cm^2$ in cross sectional area) were located between two flat plates (2.5 x 2.5 cm) and compressed perpendicularly to the long axes of muscle fibres with a solenoid activated by 120 V for 1 sec. Peak forces of several hundred granes were reached. The decrease in the hysteresis area of the force-distance relationship was used for evaluating decreasing compressibility post mortem. The hysteresis areas were decreased to 0.68 plus or minus .071 of their initial values. 101 plus or minus 48 min postmortem was the point of inflexion hysteresis decline curve. Between this point and 24 h postmortem there was little further change in compressibility. The results indicate that it is possible to measure pork softness by vibratory testing of intact carcasses with asynchronomous data collection. MVG

2320 Ternstrom (A) and Molin (G). Incidence of potential pathogens on raw pork, beef and chicken in Sweden, with special reference to **Erysipelothrix** rhusiopathiae. Journal of Food Protection 50(2); 1987; 141-146

Bacon

2321 Pensabene (JW), Gates (RA), Jenkins (RK) and Fiddler (W). Effect of cesium-137 radiation on the formation of N-nitrosopyrrolidine in bacon. Journal of Agricultural and Food Chemistry 35(2); 1987; 192-194

To date, the majority of information collected on the irradiation of bacon has been based on ^{60}Co as the radiation source. In this study, ^{137}Cs was used as the radiation source for the treatment of bacon. Bacon prepared with 550 p.p.m soidum ascorbate and either 120 or 40 p.p.m sodium nitrite was irradiated at absorbed doses of 0.75, 1.5, and 3.0 Mrad. Results show that only at 3.0 Mrad there was a significant difference from the nonirradiated control in both residual nitrite and N-nitrosopyrrolidine (NPYR) values and that NPYR levels were significantly less in the 40 p.p.m nitrite bacon than in the 120 p.p.m bacon. Radiation of bacon prepared with and without ascorbate also showed an additive effect on nitrite destruction and NPYR reduction. The results suggest ^{137}Cs may not be as effective as ^{60}Co in reducing nitrite/NPYR in bacon. AS

Rabbits

2322 Gariepy (C), Amiot (J), Simard (RE), Boudreau (A) and Raymond (DP). Effect of vacuum-packing and storage in nitrogen and carbon dioxide atmospheres on the quality of fresh rabbit meat. Journal of Food Quality 9(5); 1986; 289-309

In order to evaluate the effects of vacuum packaging and storage in carbon dioxide (100%) and Nitrogen (100%) atmospheres on the quality of fresh rabbit meat, rabbit carcasses were stored in the dark at 0 C and 3 C for 50 days. Storage in carbon dioxide maintained good microbiological quality, but caused a decrease in water rentention capacity which led to discolouration and toughening of the meat. Storage under nitrogen atmosphere improved water retention capacity thereby colour retention but this advantage is negatived by lower microbiological quality. Due to the loss of water from the tissues vacuum packing resulted in charges in the organoleptic quality of the meat similar to those observed by storage in carbon dioxide atmosphere. At refrigerated temp., a variation of 3 C had a larger effect on bacteriological counts and tenderness than the outer quality parameters. Thus a mixture of gas (carbon dioxide and nitrogen) having both the bacteriostatic properties of one and the organoleptic advantages of the other is recommended to be the better and optimum choice for increasing the shelf life of rabbit meat. NGKR

Meat products

Ham

2323 Thiel (LF), Bechtel (PJ), Mckeith (FK) and Brady (P). The influence of reduced salt on the yield, breaking force, and sensory characteristics of chunked and formed ham. Journal of Food Quality 9(5); 1986; 355-364

Increasing awarness of the sodium content in processed meats has promoted interest in reduced salt products. The objective of this study was to examine the effect of reducing sodium chloride on sensory and processing properties of chunked and formed ham. Chunked and formed hams were made with 0, 0.5, 1, 1.5 and 2% added salt. This study indicates that the sodium content of restructured ham may be lower by decreasing the quantity of sodium added during processing. The characteristics are not altered by reducing salt from 2% to 1.5% though it lowered the yield, breaking force and visual acceptability.

It is found that by reducing below 1.5% to 1.8% the product differed significantly. Reductions of salt to levels below 1.0% further depresses these and other characteristics. It is indicated that to produce successfully high quality chunked and formed hams at low salt levels will require modification of the processing techniques. NGKR

Poultry

Chickens

2324 Noleau (I) and Toulemonde (B). Volatile components of roasted chicken fat. **Lebensmittel-Wissenschaft und-Technologie** 20(1); 1987; 37-41

During a poultry flavour study, the dripping fat of roasting chicken was collected and its volatile fraction extracted by mole. distillation. In this fraction, more than 200 compounds were identified by GC-MS and quantified by GC-FID. One third of these compounds have not previously been described in cooked, fried or roasted chicken. The majority of these newly identified compounds are either acids or esters. Sniffing of the eluted volatiles was performed to identify chicken-like odour. AS

2325 Scriven (F), Sporns (P) and Wolfe (F). Investigation of nitrite and nitrate levels in paper materials used to package fresh meat. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 188-192

A method was developed for the analysis of nitrite and nitrate in paper using reduction to nitric oxide and chemiluminescence detection. The potential for fresh meat contamination by nitrite and nitrate from over 50 different samples of paper and paperboard packaging materials was evaluated by this method of analysis. Concn. of nitrite were determined to be < 5 µg of nitrite$^-$ g, with two exceptions containing 14.5 and 19 µg of nitrite$^-$ g. Nitrate concn. were generally higher, though 50% of the materials analyzed contained less than 10 µg of nitrate$^-$ g. The greatest hazard of contamination of fresh meat was determined to be through contact with gummed paper tape, which contains extremely high levels of nitrate (25 800 - 32 700µ g of nitrate$^-$ g. Migration studies using giblet bags containing 120µ g of nitrate$^-$ g in contact with chicken breast meat showed that low but detectable migration of nitrate from the paper packaging material to meat could occur at even these low nitrate levels. AS

Broilers

2326 Lillard (HS), Blankenship (LC), Dickens (JA), Craven (SE) and Shackelford (AD). Effect of acetic acid on the microbiological quality of scalded picked and unpicked broiler carcasses. **Journal of Food Protection** 50(2); 1987; 112-114

Acetic acid (0.5%) in scald water might effectively control **Salmonella** cross-contamination of carcasses in scald tank due to bactericidal effect of on enteric pathogens in the water, but had no effect on reducing Salmonellae or other bacteria on the carcasses. Acetic acid (0.5%) spray in the pickes did not improve bacterial quality of picked carcasses. Thus subsequent cross contamination of carcasses during picking might still occur due to surface contamination of the birds with enteric pathogens. MVG

Turkeys

2327 Smith (DM). Functional and biochemical changes in deboned turkey due to frozen storage and lipid oxidation. **Journal of Food Science** 52(1);

1987; 22-27

Lipid oxidation, freezing and frozen storage caused myofibrillar protein denaturation and decreases in functionality in both MDT and HDT. Antioxidants prevented lipid oxidation and some of the protein denaturation which occurred during storage although most of the denaturation was a result of other reactions. It is seen that protein denaturation and subsequent functionality changes which occur in turkey should be of concern to processors as MDT is often stored for long periods. Denaturation caused by freezing and lipid oxidation should be of concern to scientists studying into the properties of turkey proteins in relation to storage. NGKR

Poultry products

Eggs

2328 Lanser (AC) and Emken (EA). Comparative deposition of trans-10- and cis-9-octadecenoates in egg and tissue lipids of the laying hen. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 248-252

The deposition of [10(11)- ^{3}H]-trans-10-octadecenoate (10t-18:1- ^{3}H) was compared to that of [10- ^{14}c]-cis-9-octadecenoate (9c-18:1]- ^{14}c) in the major egg yolk neutral lipids and phospholipids and in organ lipids from the laying hen. In egg yolk lipids, discrmination occurred against incorporation of 10t-18:1- ^{3}H for each lipid component and at each acyl position examined except the 1-acyl position of phosphatidylethanolamine. Retroconversion of 10t-18:1 ^{3}H occurred to the extent that 15 and 27% of the tritium label was associated with 16:1 in yolk triglycerides and total liver lipids, resp. A second tritiated metabolite, containing 24% of the recovered label in yolk triglycerides, was tentatively identified as a conjugated octadecadienoic acid. Tissue lipid analyses indicated that more 9c-18:1- ^{14}C than 10t-18:L1- ^{3}H was deposited into all tissues except in the crop/gizzard contents and in feces. These combined data suggest 10t-18:1 is preferentially oxidized relative to 9c-18:1. AS

2329 Nourooz-Zadeh (J) and Appelqvist (L-A). Cholesterol oxides in Swedish foods and food ingredients: Fresh eggs and dehydrated egg products **Journal of Food Science** 52(1); 1987; 57-62

Cholesterol oxides were enriched from lipid extracts of fresh and dehydrated egg yolk products by chromatography on Lipidex and TEAP-Lipidex. Appropriate fractions from TEAP-Lipidex were analyzed by capillary GLC as their TMS derivatives. At the detection limit level, ca 0.2 p.p.m in total lipids, no cholesterol oxides could be detected in fresh egg yolk. Similarly, spray dried egg yolk powder contained only traces of cholesterol oxides when fresh or stored for 2 months at 4 C. Prolonged storage gave lipid extracts which contained variable levels (0.2-12 p.p.m) of known oxidation products, viz., cholest-5-ene-3 Beta, 7 Alpha-diol, cholest-5-ene-3 Beta, 7 Beta-diol, 5, 6 Alpha-epoxy-5 Alpha-cholestan-3Beta-ol, 5, 6 Beta-epoxy-5 Beta-cholestan-3Beta-ol, cholest-5-ene-3Beta, 20Alpha-diol, 3Beta-hydroxycholest-5-en-7-one. Traces or small quantifiable amounts of cholest-5-ene-3Beta, 25-diol and 5alpha-cholestane-3Beta, 5, 6Beta-triol were observed in some samples at longer storage periods. AS

2330 Southam (G), Pearson (J) and Holley (RA). Survival and growth of **Yersinia enterocolitica** in egg washwater. Journal of Food Protection 50(2); 1987; 103-107

Y. enterocolitica serotypes 0:3 and 0:8 were studied for their ability to survive a 1% (w/v) whole egg suspension containing detergent (synthetic egg wash water) at various temp. (38 and 42 C) from neutral to alkaline pH (7,9,5,10 and 10.5). The serotype 0:3 was able to grow in synthetic egg wash water at pH 10 and 38 C. Both strains were able to grow at refrigerated temp. when pH was less than and equal to 10. MVG

Egg yolks

2331 Woodward (SA) and Cotterill (OJ). Texture and microstructure of cooked whole egg yolks and heat-formed gels of stirred egg yolk. **Journal of Food Science** 52(1); 1987; 63-67

This study to investigate the texture and microstructure of cooked egg yolk and to compare the texture and microstructure of egg yolk cooked intact with those of egg yolk stirred before cooking, showed that the presence of discrete grains contributed to the crumbly texture of ShCy. The crumbliness was attributed to structural characteristics. NGKR

2332 Woodward (SA) and Cotterill (OJ). Texture profile analysis, expressed serum, and microstructure of heat-formed egg yolk gels. **Journal of Food Science** 52(1); 1987; 68-74

The textural properties of egg yolk gels as affected by several variables including pH, time and temp. of heating and protein and salt concn. The results showed that gel hardness generally increased with increasing pH, protein or salt concn., temp. and length of heating time and cohesiveness and springiness of gels increased with time and temp. NGKR

SEAFOODS

Fish

2333 Carrion (MO) and Valencia (ME). Influence of pH and acrilamide concentration in fish protein separation by SDS-PAGE. **Anales de Bromatologia** 37(2); 1985; 333-340 (Es).

2334 Jiang (S-T), Hwang (B-S) and Tsao (C-Y). Effect of adenosine-nucleotides and their derivatives on the denaturation of myofibrillar proteins **in vitro** during frozen storage at -20 C. **Journal of Food Science** 52(1); 1987; 117-123

To investigate the effect of adenosine-nucleotides and their derivatives on the denaturation of myofibrillar proteins, 235 nmoles/mL adenosine-5′-diphosphate (ADP), adenosine-5′-monophosphate (AMP) inosine-5′-monophosphate (IMP), inosine (HxR), or hypoxanthine (Hx), was added to 3 mg/mL actomyosin (AM) solution suspended in 0.10M KCl solution and stored at -20 C for 12 wk. The AM was extracted from milkfish dorsal muscle. Protein denaturation was evaluated by measuring solubility, Ca-ATPase and Mg(EGTA)-ATPase activity of AM, by analyzing changes in electrophoretic profiles and transmission electron microscopy. Inosine and hypoxanthine accelerated protein denaturation compared to control samples. Infrared spectrum analyses indicated that negatively charged groups of these nucleotides interacted with amino or imino groups on AM after addition. ADP, AMP, and IMP had a protective effect on denaturation of AM during frozen storage at -20 C. AS

2335 Josephson (DB), Lindsay (RC) and Stuiber (DA). Influence of processing on the volatile compounds characterizing the flavour of pickled fish. **Journal of Food Science** 52(1); 1987; 10-14

Studies were included to evaluate the contribution of certain equilibrium reactions involving carbonyls and alcohols that could influence amounts of these compounds in pickled fish and to quantify these fresh fish volatile compounds at each stage of processing. It was shown that model systems containing aqueous 5% acetic acid and selected long chain alcohols did not yield measurable (1 p.p.b) concn. of corresponding acetate esters when stored at 4 C for upto 2 wks. NGKR

2336 Karmas (E) and Lauber (E). Novel products from under utilized fish using combined processing technology. **Journal of Food Science** 52(1); 1987; 7-9

New ways to create fish protein based snack foods were investigated by mincing or surimi processing followed by fermentation, extrusion and intermediate moisture food (IMF) processing. A dough of fermented fish wheat flour, corn starch and water was extruded and subsequently dried resulting in a IMF product at pH 5.2, water activity 0.90 and moisture about 30%. The products were found to be stable with chewy texture and highly flavoured. NGKR

2337 Wong (K) and Gill (TA). Enzymatic determination of trimethylamine and its relationship to fish quality. **Journal of Food Science** 52(1); 1987; 1-3

The present study was to develop a rapid visual colour test for the estimation of TMA in fish extracts and this method would eliminate most of the disadvantages inherent in previously reported methods. The min. detectable TMA level was 0.05 μmol. and requires very little laboratory equipment involving enzymatic procedure with colour development and visual comparison so as the microbiological quality of fish. NGKR

Croaker

2338 Venugopal (V). Feasibility of incorporation of partially deodourised fish meat in extrusion cooked products. **Journal of Food Science and Technology, India** 24(3); 1987; 147-148

Croaker (**Johnius dossumuri**) meat was partially deodourised by boiling the dressed fish in 0.3% orthophosphoric acid followed by passing through a screw press to separate the meat. The meat, having a moisture content of 50% was mixed with flour and was subjected to extrusion cooking. The product had no fishy odour suggesting the feasibility of using partially deodourised meat from miscellaneous fishes in extrusion cooked products. KAR

Flounder

2339 Mcdonald (RE) and Hultin (HO). Some characteristics of the enzymic lipid peroxidation system in the microsomal fraction of flounder skeletal muscle. **Journal of Food Science** 52(1); 1987; 15-21

The microsomal lipid peroxidation system of flounder muscle was characterized as to response to temp., cofactor requirements, inhibitors, and activators. The enzyme-catalyzed reaction had a rate-limiting step prior to the formation of lipid hydroperoxide. The K for NADH of the enzymic system in the presence of 0.1 mM ADP was approx. 1 µM. In the presence of Fe both cysteine and ascorbate also catalyzed lipid peroxidation. While neither NADH nor ADP had an effect in the presence of ascorbate and ADP completely inhibited it. Inhibitor studies indicated that it was a free radical reaction, an -SH group was involved and oxygen reduction products and singlet oxygen participated. AS

Salmon

2340 Takahashi (Y) and Khan (MA). Impact of infrared broiling on the thiamin and riboflavin retention and sensory quality of salmon steaks for foodservice use. Journal of Food Science 52(1); 1987; 4-6

This study carried out to evaluate the effects of infrared broiling and conventional baking on quality characteristics of salmon steaks prepared as food use showed that infrared broiling did not have any adverse effect on the thiamin and rioboflavin retention. Also except for appearance the sensory quality was not significantly different from the convection oven baked salmon steaks. NGKR

Tunas

2341 Hardisson (A), Galindo (L) and Montelongo (FG). Pb, Cd, Cu, Zn and Fe levels in canned tuna fish. Anales de Bromatologia 37(2); 1985; 327-332 (Es).

PROTEIN FOODS

Infant foods

2342 Bellomonte (G), Costantini (A) and Giammarioli (S). Comparison of modified automatic Dumas method and the traditional Kjeldahl method for nitrogen determination in infant food. Journal of the Association of Official Analytical Chemists 70(2); 1987; 227-229

This study compares 2 methods for determining nitrogen and protein in various types of infant food: the Kjeldahl method, developed in 1883, which is time consuming and labour intensive, and a newer, automatic method, based on the Dumas method. In each category of infant food considered, the results obtained from both methods are shown to be comparable; however, the modified Dumas method is quicker, easier, and does not pollute the laboratory environment. AS

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

2343 Ishiwata (H), Inoue (T), Yamazaki (T) and Yoshihira (K). Liquid chromatographic determination of melamine in beverages. Journal of the Association of Official Analytical Chemists 70(3); 1987; 457-460

Melamine is separated by column chromatography using cation and anion resins and determined by ion-pair liquid chromatography using an ODS column and a mixture of acetonitrile and 0.05 M phosphate buffer (pH 3.0) containing 0.005 M sodium 1-laurylsulphate as a mobile phase. Recoveries ranged between 90.3 plus or minus 7.8 and 102.1 plus or minus 5.6% at levels of 0.6 to 2.4 p.p.m in 4 kinds of beverages. The quantification limit was 2.5 ug melamine in 50 ml beverage. The method was applied to the migration test of melamine from melamine-formaldehyde resin products to the beverages. MVG

Alcoholic beverages

Beer

44 Allen (WG). Barley and high adjunct brewing with enzymes. **Brewers" Digest** 62(3); 1987; 18-26

Discusses enzymes in barley brewing, malt replacement enzyme system, milling of barley in barley brewing, methods of mashing in barley brewing, enzyme system use level of malt replacement, properties of barley worts and beers obtained with barley brewing, economics of barley brewing, high adjunct brewing with enzymes, and use level in high adjunct brewing. BV

345 Cason (DT), Reid (GC) and Gatner (EMS). On the differing rates of fructose and glucose utilization in **Saccharomyces cerevisiae**. **Journal of the Institute of Brewing** 93(1); 1987; 23-25

Fructose is utilised slower than glucose when the two sugars are fermented separately. This phenomenon occurs in a growth promoting medium as well as ion brewers wort when using the brewing yeast **Saccharomyces cerevisiae**. The use of a fructose adjunct in wort at concn. of 2% w/v and above, may result in residual concn. of fructose to remain at the end of fermentation and consequently taint the beer with a sweet off-flavour. Glucose and fructose have no effect on maltose utilisation. Thus they do not exert catabolite repression on the maltose membrane transport system in the particular brewing strain of **Sacch. cerevisiae** under investigation, when fermented in brewers wort. AS

346 Morris (TM). The relationship between haze and the size of particles in beer. **Journal of the Institute of Brewing** 93(1); 1987; 13-17

Haze measurements have been obtained for suspensions of polystyrene latex particles of known diameter using two light scattering instruments which measures at angles of 90 and 13 C resp. The results agree well with the theory of light scattering and demonstrate the significant effects of particle size and angle of detection upon the instrumental values for haze. This information has been used to correlate the particle size distributions of a number of beers, as measured by Coulter Counter, with corresponding, measured haze values. AS

2347 Nduka Okafor and Aniche (GN). Studies on the brewing of lager beer from Nigerian sorghum. **Journal of Food Science and Technology, India** 24(3); 1987; 131-134

Lager beer was brewed from sorghum (**Sorghum bicolor**) malt using the three stage decoction method and 30% sucrose as adjunct. The sorghum malt wort and the progress of fermentation as measured by sp. gr. (1.04758), pH (5.5), temp., apparent and real extracts, alcohol content by wt., real and apparent degrees of attenuation and yeast concn. followed similar to that for barley fermentation. Physical and chemical properties of the sorghum beer as also the organoleptic tests showed that it was very similar to barley beer. It had the clear sparkling straw-coloured, hop-taste characteristic of lager beer. The sorghum lager beer had a shelf-life of at least 14 months. KAR

2348 Verzele (M), Schuddinck (G), Proot (M) and Sandra (P). Quantitative capillary gas chromatography of trihydroxyoctadecenoic acids in beer. **Journal of the Institute of Brewing** 93(1); 1987; 26-29

A rapid and precise analytical method for the detn. of trihydroxyoctadecenoic acids in wort and beer is described. AS

2349 Waites (MJ) and Ogden (K). The estimation of nisin using ATP-bioluminometry. **Journal of the Institute of Brewing** 93(1); 1987; 30-32

In the near future, nisin may be used within the Brewing industry to control lactic acid bacteria. Therefore, there is a need for a rapid and reliable assay procedure for this bacteriocin. Nisin is presently estimated using various bioassay methods, many of which require several days incubation before results are obtained. The technique of ATP bioluminometry has now been utilised for the assay of nisin in beer and wort using a strain of **Lactobacillus brevis** as the test organism. The assay is rapid, and can be used to estimate nisin within the range 0-120 units ml with a percentage error of less than 5%. AS

Malt

2350 Fors (SM). Isolation of pyrazines in extruded malt by stepwise extraction and distillation. **Lebensmittel-Wissenschaft und-Technologie** 20(1); 1987; 42-47

A test solution of alkylpyrazines was used to determine whether their recovery was influenced by changes in extraction conditions such as the use of different solvents pH adjustment and salting out. Dichloromethane gave good recovery and freon-11 was successful for the extraction of pyrazines substituted with 2-5 carbon atoms. Diethyl ether was less useful and was excluded rather early in this study, due to low recovery combined with difficulties in obtaining a satisfactory pure solvent, pH adjustment (alkaline) increased the recovery by 10-15% when freon-11 was used as the solvent, but for dichloromethane the results were similar to those without pH adjustment. Salting out increased the recovery only slightly. Freon-11 and dichloromethane were used for extraction of pyrazines in extruded malt. Fifteen pyrazines were identified and quantified (range 0.07-10 µg/g malt). No difference in yield was observed in the analysis of samples with and without pH adjustment. Variations in pH in the range 5-11 are not critical for the isolation of pyrazines in malt. AS

2351 O'Farrell (DD). Use of nitrogen dioxide after steeping to inhibit formation of nitrosamines in malt. **Journal of the Institute of Brewing** 93(1); 1987; 33-36

Application of nitrogen dioxide to barley at the start of the germination phase of malting inhibits the formation of NDMA in subsequent kilning, even when high nitrogen dioxide conditions are used. Malts produced using these treatments contained reduced levels of nitrosamines and other analytical values were normal. Beer of sound flavour and other properties was brewed from these malts. However, it has yet to be established whether other nitroso compounds are formed during nitrogen dioxide treatment. Consequently a recommendation that this treatment can be adopted as an industrial protocol awaits further investigation. AS

Whisky

2352 Thomas (KP). The fate of the sulphur content of malathion when applied to barley used to produce malt whisky. **Journal of the Institute of Brewing** 93(1); 1987; 18-22

The use of malathion to protect malting barley from infestation by insects led to fears that malt whisky could be tainted by odorous sulphur compounds such as mercaptans derived from the malathion. Laboratory scale experiments in which barley was treated with sulphur-35 radio-labelled malathion, showed that the majority of the sulphur from the malathion was lost in the early stages of processing and that none penetrated to the final distilled spirit. Treatment of malt with the radio-labelled malathion showed that although the majority of the sulphur from the malathion was lost after the infusion and fermentation stages, a small percentage was found in the distilled spirit. However, re-use of the final infusion liquor as the first liquor on the next batch of malt as in common practice, could lead to a slight risk of an accumulation of sulphur compounds until equilibrium is reached. AS

Wines

2353 Larrechi (MS), Callo (MP), Rius (FX) and Guasch (J). Na, K, Ca, Fe and Cu content in red wines from Tarragona (Spain). **Revista de Agroquimica y Tecnologia de Alimentos** 27(1); 1987; 53-59 (Es).

Na, K, Ca, Fe and Cu contents were determined, either by FES or by AAS, in 52 samples of untreated red wine and 37 samples of treated and bottled red wine, all of them under the Spanish denominations of origin "Priorat", "Tarragona" and "Terra Alta". A comparative study between the standard addition method and the direct measurement on diluted samples has been carried out by covariance analysis; both procedures showed statistically comparable results for all studied metallic ions. The mean values (mg/l) found in "Priorat", "Tarragona" and "Terra Alta" untreated wines were, resp., the following: K, 1,060, 1,002 and 890; Na, 30, 24 and 20; Ca, 57, 74 and 86; Fe, 9.9, 12.8 and 12.7; Cu, 0.63, 0.55 and 0.18. The bottled wines showed some differences with respect to the latter values attributable to the elaboration process. AS

2354 Sales (D), Valcarcel (MJ), Martinez-Ossa (E) and Perez (L). A depurative process for wine distilleries wastes. **Process Biochemistry** 22(2); 1987; 64-66

This paper describes a process for the complete depuration of wastes from wine distilleries with a mean alcohol production of 10,000 l/day. The process consists of the anaerobic digestion of the wastes (with a prior neutralization-centrifucation stage) followed by a centrifugation stage and aerobic digestion. Overall, 1000 kg per day of sludges with potential as animal feed or fertiliser are produced, together with 400 m^3 of methane at STP. The COD is reduced from 25-75 oxygen/l to 0.1-0.2 g oxygen/l. AS

Non-alcoholic beverages

Fruit juices

Mango juices

2355 Gaonkar (SM) and Kulkarni (PR). Practical applications of microcrystalline cellulose prepared from water hyacinth in food formulations. **Indian Food Packer** 41(3); 1987; 29-37

Microcystalline cellulose (MCC) was prepared from water hyacinth and the rheological and anticaking properties were determined as also used at 0.1 to 0.5% concn. along with mango juice as a thickening agent. The MCC prepared from water hyacinth was comparable to commercial MCC in all respects. The content of heavy metals and others (Pb, Cu, Zn, Cd, Fe and Ca) were within the permissible limits. Incorporation of MCC to sugar at 0.5, 1.0 and 2.0% level increased the moisture content to 0.90, 0.70 and 0.55%, resp. when kept for 7 days at 70% RH as against the increase of 0.2 to 5.0% moisture in the control group. Addition of MCC to sugar improved the flow properties of sugar while the control sugar without added MCC lumped completely. The sugar solution with added MCC up to 0.5% level had good acceptability; the acceptability was poor with higher levels of addition of MCC to sugar. The viscosity of gels prepared with 3 to 15% concn. of MCC showed a linear decrease in viscosity to the r.p.m. applied indicating it to be non-Newtonian. Mango juice with 0.10% and 0.30% MCC has very good overall acceptability, while for 0.50% concn. a slight chalky mouth feel was perceptible. KAR

Orange juices

2356 Crivaro (NO), Carron (RB) and Najera (M). Characterization of orange juice by means of regressive and micrographic analysis. **Anales de Bromatologia** 37(2); 1985; 293-305 (Es).

2357 Braddock (RJ) and Marcy (JE). Quality of freeze concentrated orange juice. **Journal of Food Science** 52(1); 1987; 159-162

The results of pilot scale experiments to determine the effects of some juice processing variables such as heat inactivation of enzymes and pulp content on quality of freeze conc. orange juices were studied. It was seen that pasteurised valencia and temple orange juices conc. to 45 C Brix by freeze concn. retained their fresh juice flavour. Direct steam infusion heating to inactivate enzymes allowed more rapid heating than indirect heating and successfully lowered juice peel oil during vacuum cooling. The importance of the enzyme stabilisation pasteurization process prior to freeze concn. has been emphasised. This process has recently become commmercial for orange, grape fruit and mandarin juices. Fresh juice freeze conc. to 45 C then pasteurised at temp. of 80, 97 and 111 C had reduced sucrose (up to 25%) as the temp. increased to 111 C. NGKR

Pineapple juices

2358 Lee (HS) and Nagy (S). High performance liquid chromatography of 2,5-dimethyl-4-hydroxy-3 (2H)-furanone in pineapple and grapefruit juices. **Journal of Food Science** 52(1); 1987; 163-165

A simple and rapid HPLC method to quantitate 2,5-Dimethyl-4-hydroxy-3(2H)-furanone (DMHF) in pineapple juice and apply this methodology to a study of DMHF changes in grape fruit juice during storage has been developed. 2,5-dimehtyl-4-hydroxy-3(2H)-furanone is responsible for the burnt pineapple flavour in pineapple juice . The DMHF contents ranged from 1.6 to 27.3 p.p.m from fresh pineapple juices by this methodology and using this system the production of DMHF was monitored in canned grapefruit juices during storage at varying temp. using detection by UV at 290 nm. NGKR

FATS AND OILS

Fats

2359 Rojo (JA) and Perkins (EG). Cyclic fatty acid monomer formation in frying fats. I. Determination and structural study. **Journal of the**

American Oil Chemists" Society 64(3); 1987; 414-421

360 Takano (S) and Kondoh (Y). Triglyceride analysis by combined argentation - nonaqueous reversed phase high performance liquid chromatography. **Journal of the American Oil Chemists" Society 64(3); 1987; 380-383**

Full analysis of triglycerides of natural fats and oils has been investigated by the combination of argentation high performance liquid chromatography (HPLC) with non aqueous reversed phase (NARP) HPLC. An infrared detector was used in argentation HPLC, because it indicated molar responsibility to all triglycerides. After peak trapping with argentation HPLC, each triglyceride fraction was analyzed with NARP chromatography using the glyceride-selective post-column reactor detector. The results of the analyses of triglycerides of palm oil and cocoa butter by the proposed method agreed well with those reported earlier. AS

Fatty acids

2361 Takagi (T) and Miyashita (K). Autoxidative rates of nonmethylene-interrupted polyenoic fatty acids. **Journal of the American Oil Chemists" Society 64(3); 1987; 407-413**

Autoxidative rates of free fatty acids and methyl esters increased in the following order: oleic (c9-18:1), c5, c9-18:2, linoleic (c9, c12-18:2), c5, c9, c12-18:3, t5, c9, c12-18:3, and linolenic (c9, c12, c15-18:3). The increase of the rates due to the Delta 5-olefinic bond was much lower than that due to an olefinic bond extension in a methylene-interrupted sequence. Agreement of the oxidative rates obtained from conjugated diene content with those obtained from POV showed that oxygen attack did not occur at the isolated olefinic bond, but at the methylene-interrupted diene in the oxidation of 5, 9, 12-18:3. The Delta 5-olefinic bond may promote the oxidation of the methylene-interrupted diene intramolecularly. AS

Oils

2362 Larsson (BK), Eriksson (AT) and Cervenka (M). Polycyclic aromatic hydrocarbons in crude and deodorized vegetable oils. **Journal of the American Oil Chemists" Society 64(3); 1987; 365-370**

The efficiency of refining process in removing polycyclic aromatic hydrocarbons (PAH) from crude vegetable oil were studied. Of the crude oils coconut oil had by far the largest PAH levels. However, PAH levels in refined coconut oil was slow. This shows that activated charcoal treatment used for removing PAH, from coconut oil achieves the desired effect. In crude soybean and rapeseed oils the PAH levels were low and variable. These are also removed by activated charcoal and refined oil contain low PAHs. This is probably due to the evaporation of PAH in the deodourisation process when steam is passed through hot oil under high vacuum. This, has however, only a marginal effect on the high molecular PAHs of which several are classified as carcinogens. MVG

2363 Nasirullah and Seher (A). Fatty acid composition of some European edible vegetable seed lipids. Part II. **Journal of Food Science and Technology, India 24(3); 1987; 138-139**

Fatty acid composition of the seed lipids of **Brassica rapa, Sinapis alba** (Brassicaceae), **Spinaca oleraceae** and **Beta vulgaris** (Chenopodiaceae) were determined by capillary-gas-chromatography for the first time in comprehensive manner. Neutral lipid content ranged from 4.0 to 10.0%. Neutral lipids of **B. rapa** and **S. alba** contained 46.1 and 15.5% erucic acid and 10 and 8.2% eicosenoic acid; oleic, linoleic and linoleic acid contents in these two species were 13.6, 24.7, 134.5, 20.6 and 8.6, 20.7% resp. **Sp. oleraceae** and **Beta vulgaris** seed lipids contained 10.4 and 15.7% palmitic, 23.5 and 31.3% oleic and 60.9 and 43.2% linoleic acid resp. Other long chain fatty acids (20:2, 20:3, 22:0, 22:2, 22:3, 24:0 and 24:1) have been found in small amounts (0-4.3%). (For part I see Fette Seifen Anstrichmittel, 1984, 86, 264). KAR

Amaranth oils

2364 Garcia (LA), Alfaro (MA) and Bressani (R). Digestibility and nutritional value of crude oil from three amaranth species. **Journal of the American Oil Chemists" Society** 64(3); 1987; 371-375

Crude amaranthus oils extracted from hexane from **A. cadatus**, **A. hypochondriacus** and **A. cruentus** were analysed for acid value, saponification value and iodine number and included in basal casein diets for rats at 5 and 10% levels to replace equal amounts of refined cottonseed oil. The oils from **A. cruentus** and**A. hypochondriacus** were similar in properties with wt. gain and PER at 5 or 10% levels being similar to cottonseed oil. True digestibility of amaranthus oil was lower than cottonseed oil with **A. cruentis** oil giving lowest digestibility. Similar serum cholesterol level were induced from **A. caudatus**, **A. hypochondriacus** and cottonseed oil while A. cruentus oil gave significantly higher values. Hemoglobin, hematocrit and serum proteins were in all groups. Similarly microscopic chagnges in organs of the rets. It was concluded crude amaranth oil had lower digestibility than cottonseed oil but is not responsible for growth depressing effects when seed is raw as compared to processed materials. MVG

Argania sideroxylon oil

2365 Morton (JF) and Voss (GL). The argan tree (**Argania sideroxylon**, sapotaceae), A desert source of edible oil. **Economic Botany** 41(2); 1987; 221-233

Canola oils

2366 Abraham (V) and deMan (JM). Determination of total sulphur in canola oil. **Journal of the American Oil Chemists" Society** 64(3); 1987; 384-387

A rapid and sensitive chromatographic method for the detn. of total sulphur in canola oil is described. All forms of sulphur in the oil are quantitatively converted to sulphate in an oxygen bomb. The sulphate is separated, from other ions and measured using an ion chromatograph equipped with a conduuctivity detector. Standards containing different forms of sulphur were prepared and analyzed with this method. Recovery achieved on 11 compounds covering the concn. range from 9.3 to 14.35 mg/kg S ranged from 95.7% to 102.2%. The coefficient of variability of total sulphur in canola oils ranged from 1.0% to 2.9%. Values obtained on high sulphur content mustard oils when plotted vs. the values determined by barium precipitation method showed a correlation coeff. of 0.997 and provided a slope of 1.0. This new method employing comparatively simple equipment requires < 40 min. for a complete analysis and is reliable for the detn. of as little as 0.5 mg/kg S in canola oil. AS

Cottonseed oils

2367 Fisher (GS), Frank (AW) and Cherry (JP). Determination of total gossypol at parts-per-million levels. **Journal of the American Oil Chemists" Society** 64(3); 1987; 376-379

The official AOCS method Ba 8-78 for total gossypol has been modified by introduction of two clean-up steps. These steps reduce sample blanks and also substantially increase the concn. of dianilino-gossypol available for spectrophotometric measurement. An improved method of correcting sample absorptions for blanks, which reduces the possibility of over or under compensation, and criteria for juding the quality of the results have been added. With these modification, the method is more than adequate for grading glandless cottonseed under Rule 112 of the National Cottonseed Products Association. As little as 1 p.p.m can easily be measured in sound cottonseed samples. The method is not universally applicable to mixtures that may contain TG, but the criteria of quality should permit identification of samples to which it is not applicable and, hence, prevent reporting of inaccurate TG concn. Additional modifications for use with foods and other complex mixtures are suggested. AS

Essential oils

2368 Lawrence (BM) and Reynolds (RJ). Progress in essential oils. **Perfumer & Flavorist** 12(3); 1987; 58-70

Briefly covers mikan oil (Citrus unshiu), orange oil and Yuzu oil (Citrus junos). BV

Citrus limon

2369 Laencina (J), Goretti (G), Melendreras (FA) and Flores (J). Kaolin PLOT columns in Citrus limon essential oils analysis. **Anales de Bromatologia** 37(2); 1985; 315-326 (Es).

Olive oils

2370 Fakourelis (N), Lee (EC) and Min (DB). Effects of chlorophyll and Beta-carotene on the oxidation stability of olive oil. **Journal of Food Science** 52(1); 1987; 234-235

The effects of chlorophyll and Beta-carotene on the oxidation of olive oil in the presence of light has been studied during storage of the oil in sample bottles using gas chromatography for headspace oxygen and measuring peroxide values. It has been found that chlorophyll in the purified oil by silicic column chromatography acted as a photosensitiser and Beta-carotene minimised lipid oxidation under light storage by its light filtering effect and singlet oxygen is found to be responsible for the photooxidation of olive oil which contians chlorophyll. NGKR

Palm oils

2371 Berger (KG) and Ong (SH). The industrial uses of palm and coconut oils. **Oleagineux** 40(12); 1985; 613-621

Palm oil, from the flesh of the oil palm fruit, contains mainly palmitic and C^{18} unsaturated acids. The palm kernel oil on the other hand is a lauric oil similar in composition to coconut oil, both containing mainly saturated acids of chain length C^{6} - C^{18}. The three oils are used in the food industry and in the oleochemicals industry.

Approximately, 90% of palm oil is used in foods, principally for frying and in margarines, shortening and confectionery products. Palm oil is commercially fractionated to make it more suitable for some of these applications. Palm kernel and coconut oil are hard and brittle at lower temp. but have sharp melting points < 30 C. They are therefore very suitable for high fat content products such as confectionery, imitation creams. The lauric oils are a major feedstock for the oleochemicals industry. The short chain saturated fatty acids are fractionally distilled into end products of varying degree of purity, which in turn are transformed into alcohols, amines, amides, esters for a large variety of specialised end uses in detergents, plastics, etc. Soap making is a world wide industry using 10-15% lauric oils in all high quality soaps. Palm oil is an alternative to tallow in soap. AS

2372 Chow (MC), Ho (CC), Sutanto (J) and Ong (SH). Nature of palm oil in centrifuge sludge waste water. **Journal of the American Oil Chemists" Society** 64(3); 1987; 393-396

In attempting to improve oil recovery, palm oil retained in the centrifuge sludge waste has been categorized and quantified. It is composed of (i) 30% free oil droplets; (ii) 56% oil released after cellulase treatment followed by detergent washing, and (iii) 14% residual oil which remains diffused and bound to the cell debris. The fatty acid composition indicates that all three oils are palm oil. The separated oil is highly contaminated. AS

Soybean oils

2373 Rady (AH), Mostafa (MM) and Rahma (EH). Effct of humid and dry heat application on the quality of soybean oil and cake residue. **Egyptian Journal of Food Science** 15(1); 1987; 37-50

This work was carried out to inactivate the trypsin inhibitor content of soybean seeds using differing heat treatments employed to manufacture soybean products and compare the effect of autoclaving with roasting on oil properties, fatty acid composition and unsaponifiable matter fraction of soybean oils. Results showed that autoclaving soybean seeds at 121 C for 10 min was the best method. MVG

2374 Wiese (KL) and Snyder (HE). Analysis of the oil extraction process in soybeans: A new continuous procedure. **Journal of the American Oil Chemists" Society** 64(3); 1987; 402-406

Soybean oil extraction technique were studied in which solvent was recirculated or pumped once through a suspension of soybean tissue. Both refractive index and ultraviolet absorbance were used to monitor the extraction continuously. Slices of soybean tissue showed rapid extraction from damaged tissue, followed by slow extraction from intact tissue. When soybean flakes were extracted, a continuously decreasing rate was noted. When solvent was forced through flakes, extraction was more rapid than when solvent was allowed to diffuse in and out of flakes. Reextraction of partially defatted flakes showed that the last soybean oil to be extracted was not inherently resistant to extraction. The adsorption of soybean oil to defatted flakes may account for slow removal of small quantities of oil at the end of the extraction. AS

SPICES AND CONDIMENTS

Condiments

Pickles

2375 Buescher (RW), McGuire (C) and Skulman (B). Catalase, lipoxygenase, and peroxidase activities in cucumber pickles as affected by fermentation, processing, and calcium chloride. **Journal of Food Science** 52(1); 1987; 228-229

The catalase (CAT), lipoxygenase (LO) and peroxidase (PO) activities in cucumber tissues and brines as affected by fermentation, processing, storage and calcium chloride treatments have been determined. It was observed that LO and CAT were inactivated within 3 days of exposure to fermentation brines PO activity in tissues and after being released from tissues into brines gradually declined regardless of fermentation and processing treatments. Calcium chloride retarded PO inactivation and inactivation was enhanced by alum. No activity of CAT, LO and PO was detected in cucumber juice extracts fermented by four different lactic acid bacteria. NGKR

Spices

2376 Rigney (CJ). Irradiation treatment of spices. **Indian Spices** 24(1); 1987; 12-14

This article covers tolerance dose for spices; economics of irradiation; consumer safety and commercialisation; and irradiated spices cleared by different countries for human consumption. MVG

Paprika

2377 Gorospe (O), Sanchez-Monge (JM) and Dello (J). Effect of pH, sodium nitrite and anions occurring in dry-cured sausages on the stability of paprika (**Capsicum annuum L.**) pigments. **Revista de Agroquimica y Tecnologia de Alimentos** 27(1); 1987; 120-130 (Es).

Using paprika extracts in acetone/water (40:10) (v/v), a study was carried out on the stability of the carotenoid pigments of paprika under the influence of some factors which are present in some dry cured sausages: the acidification of the mixture, anions such as lactate, chloride, phosphate, nitrate and especially nitrite. The protonic concn. in the medium did not have an important effect upon stability; however, a negative influence of anions was observed, especially phosphate and nitrate. The presence of sodium nitrite increased the instability of carotenoids, the effect being larger when the concn. of this salt was higher and the protonic concn. higher. AS

SENSORY EVALUATION

2378 Nagel (CW), Herrick (IW) and Graber (WR). Is chlorogenic acid bitter? **Journal of Food Science** 52(1); 1987; 213

It has been observed by task panel that at the concn. level used (100 mg/l) chlorogenic acid is not found to be bitter when its acid character is masked in aqueous 0.2% potassium acid tartrate as compared to aqueous 0.2% potassium tartrate alone. NGKR

2379 Osorio (FA) and Steffe (JF). Back extrusion of power law fluids. **Journal of Texture Studies** 18(1); 1987; 43-63

In this study aspects covered are 1) mathematical expression to describe flow behaviour of power law fluid in a back extrusion device; 2) Techniques developed for determining rheological properties of power law fluids from experimental back extrusion data; and 3) The mathematical model and analysis techniques experimentally verified. NGKR

2380 Szczesniak (AS). Correlating sensory with instrumental texture measurements an overview of recent developments. **Journal of Texture Studies** 18(1); 1987; 1-15

This review discusses current trends in sensory/instrumental correlations of texture measurements. This covers reasons for seeking correlations, factors affecting correlations, current trends to understand principles of sensory texture perception in order to design more optimized instrumental tests and procedures. NGKR

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Nil

BIOCHEMISTRY AND NUTRITION

Biochemistry

2381 Baver (E), Frank (H), Gerhardt (J) and Nicholson (G). Capillary gas chromatographic analysis of amino acids by enantiomer labelling. **Journal of the Association of Official Analytical Chemists** 70(2); 1987; 234-240

The optical isomers of amino acids can be easily separated by gas chromatography using capillary columns coated with the chiral polysiloxane peptide, Chirasil-Val. Quantitative trace amino acid analysis in complex mixtures such as biological fluids, sea water, or protein hydrolysates can be achieved by enantiomer labelling: The D-amino acid enantiomers, which donot occur naturally, are added to the sample prior to analysis as internal standards. Because the D-enantiomers show the same physical and chemical properties as the natural L-enantiomers, they are ideal standard refrences. In routine anlaysis the derivatization is achieved with a new automated derivatization robot. The D-standard serves as overall internal standard for the whole analytical procedure from sample enrichment to derivatization, chromatography, and response of the detector. AS

2382 Eyerman (LS), Clydesdale (FM), Huguenin (R) and Zajicek (OT). Characterization of solution properties of four iron sources in model systems by solubility studies and IR/VIS reflectance spectrophotometry. **Journal of Food Science** 52(1); 1987; 197-201

This study focussed on the degree of hydrolysis of different iron sources in model systems with and without ascorbic acid and the reversibility of hydrolysis under simulated gastric pH conditions. By visible/Infrared spectrophotometry was also evaluated as a possible predict or of both iron hydrolysis and the potential of the hydrolysed iron to be resolubilised at gastric pH. The results indicated that iron hydrolysis occured at a significant level for the hydrogen reduced elemental iron and untreated ferrous sulphate systems. Added ascorbic increased the levels of soluble iron in all systems. NGKR

2383 Maerker (G). Cholesterol autoxidation-current status. **Journal of the American Oil Chemists" Society** 64(3); 1987; 388-392

Several oxidation products of cholesterol have been reported to have biological activity in animals. Cholesterol oxidizes readily in solution, in aqueous dispersion and in foods when it is exposed to air, elevated temp., free radical initiators, light, or a combination of these. The main outline of the pathway for cholesterol oxidation is fairly well understood and involves initial formation of allylic hydroperoxides. HPLC and GC techniques are available for measuring the concn. of cholesterol oxides in animal-derived lipids. Biologically active cholesterol oxides have been reported to be present in egg products, diary products, frying oils and other foods. Their concn. may be subject to process control. AS

2384 Mallol (M), Perez-Alonso (MJ), Mata (M) and Cambon (MT). Alterations produced by oral ingestion of cadmium. **Anales de Bromatologia** 37(2); 1985; 279-291 (Es).

2385 Rouse (IL). Vegetarian diet, blood pressure and cardiovascular disease. **CSIRO Food Research Quarterly** 47(1); 1987; 22-24

Proteins

2386 Kato (A), Tanaka (A), Lee (Y), Matsudomi (N) and Kobayashi (K). Effects of deamidation with chymotrypsin at pH 10 on the functional properties of proteins. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 285-288

The effect of deamidation on the functional properties of proteins was investigated by proteolytic deamidation in an controlled condition. The emulsifying and foaming properties of egg white proteins (ovalbumin, lysozyme) and soy proteins (7S globulin, 11S globulin) were improved by the enzymatic deamidation with chymotrypsin at pH 10. About 20% of the asparaginyl or glutaminyl residues in these proteins was deamidated by the treatment with chymotrypsin without proteolysis or with a slight proteolysis. The surface hydrophobicity and the flexibility detected by digestion velocity of deamidated proteins increased, resulting in the improvement of the foaming and emulsifying properties. Thus, proteolytic deamidation was proposed to be a useful method for the improvement of functional properties of food proteins. AS

2387 Kato (A), Tanaka (A), Matsudomi (N) and Kobayashi (K). Deamidation of food proteins by protease in alkaline pH. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 224-227

A new method for the deamidation of proteins using protease in a controlled condition is described and proposed as a desirable alterantive for food protein processing. A considerable amount of ammonia was detected by the protease treatment of proteins in carbonate buffer, pH 10. Deamidation activity was investigated in detail by use of ovalbumin substrate, with which deamidation was scarcely observed in the nonenzymatic control. The optimal pH of deamidation was 10, and the optimal temp. was 20 C. The deamidation of proteins linearly increased in proportion to protease concn. The deamidation of ovalbum8n and lysozyme was about 20% with papain, pronase, and chymotrypsin at pH 10.0, while their proteolysis was scarcely observed. It was suggested from these results that deamidated proteins were obtained without proteolysis, or with slight proteolysis, by proteases in a controlled condition. AS

2388 Song (KB) and Damodaran (S). Structure-function relationship of proteins: Adsorption of structural intermediates of bovine serum albumin at the air-water interface. **Journal of Agricultural and Food Chemistry** 35(2); 1987; 236-241

Six structural intermediates of bovine serum albumin were prepared. The secondary-structure contents of these intermediates were analyzed by circular dichroism spectroscopy. Adsorption of these intermediates at the air-water interface followed a biphasic first-order kinetics. The first-order rate constants K_1 and K_2 exhibited a bell-shaped relationship with the extent of recovery of folded structure; the max. occurred when the protein contained about 50% Alpha-helix and 50% random-coil structures. Molecular area calculations indicated two distinct molecular events: the first being the area Delta A cleared for anchoring the molecule in the interface and the second being the area Delta A cleared during the rearrangement of the molecule in the interface. Although the Delta A m was the same for all the samples, the Delta A exhibited a bell-shaped relationship with recovery of the folded state. These studies have revealed that neither the completely unfolded nor the folded native protein has the ability to occupy a large area at the interface; an optimum ratio of ordered to disordered structure seems to be essential to cause greater change of surface pressure per adsorbed molecule. The relevance of these studies with regard to improving the functional properties of seed storage proteins is discussed. AS

Vitamins

Pyridoxine

2389 Tadera (K), Arima (M), Yoshino (S), Yagi (F) and Kobayashi (A). Conversion of pyridoxine into 6-hydroxypyridoxine by food components, especially ascorbic acid. **Journal of Nutritional Science and Vitaminology** 32(3); 1986; 267-277

The interactions between pyridoxine and food components were examined. Results showed that hydroxylation of pyridoxine in the presence of food components, especially, ascorbic acid, caused loss of vitamin B6 in plant foods during processing, storage and cooking. MVG

TOXICOLOGY

Mycotoxins

Fusarium

2390 Badawey (A), Halasz (A), Sawinsky (J) and Kozma (E). Influence of substrate on the F-2 and T-2 production of Fusarium species. I. Effect of corn and rice substrates. **Acta Alimentaria** 16(1); 1987; 29-43

Twenty-one identified strains of Fusarium sp. were examined for their ability to produce F-2 and T-2 toxin on sterilized, moistened rice and corn grains. The following strains were used: F. culmorum

(234 B/5, 234 B/7, 13, 15, 25), **F. graminearum** (977/12, 11, 8, 15, 39/3), **F. moniliforme** (187 B/19, 228 B/9), **F., tricinctum** (20, 21, 17, 204/10) **F. roseum** (908 B/1, 8, 908 B/6, **F. semitectum** (14) and **F. sporotrichiodies.** The F-2 and T-2 toxin production was confirmed by GLC and estimated by TLC. The strains of individual species produced the following amounts F-2 toxin per kg of corn: 4 strain of **F. culmorum** (0.77 to 205.10 mg), 3 of **F. graminearum** (8.07 to 50.70 mg), 2 of **F. moniliforme** (5, 7 to 16.00 mg) 2 of **F. roseum** (2.82 to 8.56 mg), **F. semitectum** 27.5 mg and **F. sporotrichiodies** 7.01 mg and one strain of **F. tricinctum** produced 1.44 mg T-2 toxin. On rice we found the following amounts of F-2 toxin per kg: 2 strains of **F. culmorum** (53.43 to 1166.13 mg), **F. moniliforme** (5.39 mg), 3 strains of **F. graminearum** (15.54 to 453.11 mg), one from each of **F. semitectum** and **F. sporotrichiodies** (0.12 and 0.37 mg, respectively) while **F. roseum** did not produce any toxin, but in the case of **F. tricinctum** T-2 toxin production was 119 mg per kg. AS

Penicillic acid

2391 Speer (M) and Sussmuth (R). Bacterial tests as indicators for the detoxification of the mycotoxin penicillic acid by ammonia treatment. **Food and Chemical Toxicology** 25(1); 1987; 31-34

The detoxification of penicillic acid by reaction with ammonia was examined by means of a polymerase assay using two strains of **Escherichia coli** (pol A$^+$ and pol A$^-$ and a recombination assay using two strains of **Bacillus subtilis** (rec$^+$ and rec$^-$). A 100-fold surplus of ammonia added to penicillic acid abolished the cytotoxic and genotoxic effects of penicillic acid towards the bacteria under the test conditions. The study presents the possibility of detoxifying mycotoxins in feeds by ammonia treatment and demonstrates the suitability of bacterial assays as indicators for mycotoxins. AS

Zearalenol

2392 Badawey (A), Sawinsky (J) and Halasz (A). Zearalenol production of Fusarium species in rice and corn cultures. **Acta Alimentaria** 16(1); 1987; 45-52

Three species of **Fusarium** were tested for their ability to produce zearalenon on wet autoclaved corn and rice. They belonged to the following strains: **F. culmorum** 234 B/15, 234 B/7, 15, 25, **F. graminearum** 977/12, 11, 39/3 and **F. roseum** 8, 908/11. These strains of individual species produced the following amounts of zearalenol on corn: 3 strains of **F. culmorum** 480 to 1680 ug per kg, 2 of **F. graminearum** 213 to 500 ug per kg and **F. roseum** 580 ug per kg. On the other hand the following amounts of the toxin were produced on rice: 2 strains of **F. culmorum** 400 to 8800 ug per kg, 2 of **F. graminearum** 1200 to 1920 ug per kg and **F. roseum** 350 ug per kg. AS

Pesticide residues

2393 Brown (RL), Farmer (CN) and Millar (RG). Optimization of sweep codistillation apparatus for determination of coumaphos and other organophosphorus pesticide residues in animal fat. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 442-445

Commercial sweep codistillation unit was used to quantiatively recover coumaphos from an animal fat at an optimum level. At a distillation temp. of 255 C, 20 mL/min of N and 60 min sweep time, using a Florisil trapping, the mean recovery was 91% with a coefficient of variation of 6%, other pesticides recovered induced diazinon, chlorpyrifos, ethion and bromophos-ethyl with recoveries varying 90-96% with a coefficient variation ranging between 4 and 6%. MVG

2394 Roach (JAG) and Carson (LJ). Collisionally activated decomposition mass spectrometry/mass spectrometry determination of organophosphorus pesticide residues in foods. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 439-442

Spectra of methoate, parathion and azinphos-methyl pesticides are described. Crude and cleaned up extracts of strawberries or lettuce fortified by the above pesticide at 0.2 p.p.m level were examined by direct exposure probe. Cleaned up extracts produced better data because the large over burdens of interfering coextracts was removed. MVG

FOOD LAWS AND REGULATIONS

2395 Reilly (C). Can food be too pure? The case of trace element contamination. **Food Technology in New Zealand** 39(1); 1987; 27-28

Food laws and consumers often seem to demand processed food that is totally free of all adventitious materials. Where this results in protection of consumers from toxicity it is a commendable policy. When, however, the excluded component plays a nutritional role, its wisdom can be questioned. This is particularly the case with regard to the trace elements. The dietary intake of iron, zinc, chromium, iodine and other trace elements can be increased by the use of certain types of processing procedures and equipment to bring about a form of fortification of foodstuffs which could be effective in preventing trace element deficiencies that some fear may result from our modern refined diet. AS

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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm, cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/ pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal, kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg, ml, mm)
m-equiv	milli-equivalent
M	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano- (10^{-9}, as in nm)
N	Newton ($kg\ m/s^2$)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp., spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-(as in µg, µm)
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

GENERAL

2396 Stofberg (J) and Grundschober (F). Consumption ratio and food predominance of flavouring materials. Perfumer & Flavorist 12(4); 1987; 27-68

FOOD PROCESSING

Nil

FOOD PACKAGING

2397 Robertson (G). Packing liquids in NZ. Food Technology in New Zealand 22(3); 1987; 16-17

This review covers the various aspects of packaging of liquid foods, product packaging requirements, package properties, packaging suitability, developments in asceptic filling and packaging (especially in the larger pack sizes) in polyethylene terephthalate bottles and cans and the response to such developments from the traditional packaging media like metal and glass containers. NGKR

FOOD ENGINEERING AND EQUIPMENT

Engineering

2398 Mohr (K-H). Microcomputer-controlled quality-saving sterilization of foodstuffs and biotechnological products. Lebensmittelindustrie 34(3); 1987; 106-107 (De).

2399 Rosenberg (U) and Bogl (W). Microwave thawing, drying and baking in the food industry. Food Technology 41(6); 1987; 85-91

This article attempts to survey possible applications of microwave energy for thawing and tempering; drying and freeze drying and baking. Also considers the advantages and disadvantages as compared to conventional processes. 148 references. BV

2400 Rosenberg (U) and Bogl (W). Microwave pasteurization, sterilization, blanching and pest control in the food industry. Food Technology 41(6); 1987; 92-99

This article reviews studies on use of microwaves in pasteurization and sterilization; microbial control; enzyme inactivation; insect control and other applications. 166 references. BV

Drying

2401 Blenford (D). When the heat is on. Food 9(5); 1987; 19, 21, 23

Single stage spray drying process and its use in food, pharmaceutical and chemical industries is considered. BV

Equipments

Mixers

2402 Heath (H). Pick and mix: Part 2. **Food** 9(5); 1987; 51, 53, 55, 57

Aspects discussed covers equipment needed for mixing solids. mixing liquids with solids and mixing gases. BV

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

2403 Einarsson (H). The effect of time, temperature, pH and reactants on the formation of antibacterial compounds in the Maillard reaction. **Lebensmittel-Wissenschaft und-Technologie** 20(2); 1987; 51-55

Maillard reaction products were produced by heating various aqueous solutions containing arginine and glucose, arginine and xylose, or histidine and glucose. The products were formed at various initial pH values, temp. and reaction times. The antibacterial effect of the various products was investigated using **Staphylococcus aureus** NCTC-6571. The amino acids were found to be more important than the sugars for the formation of antibacterial compounds. The products formed in mixtures containing arginine, were found to have a greater inhibitory effect than those in mixtures containing histidine. Arginine mixtures containing either glucose or xylose showed the same inhibitory effect. The formation of antibacterial compounds was favoured by a neutral or slightly alkaline pH. The antibacterial effect increased with an increase in reaction time in the mixtures containing arginine. In histidine-glucose mixtures heated at 100 C, the max. antibacterial effect was obtained after 10 or 20 h of heating. A temp. increase from 80 to 120 C greatly enhanced the rate of formation of antibacterial compounds. AS

2404 Gerschenson (LN), Alzamora (SM) and Chirife (J). Effect of sodium chloride and glycerol on the stability of sorbic acid solutions of reduced water activity. **Lebensmittel-Wissenschaft und-Technologie** 20(2); 1987; 98-99

Chemistry (Analytical)

2405 Bunch (EA). Spectrophotometric determination of aminocrine hydrochloride in creams, jellies and suppositories: Interlaboratory study. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 560-565

A previously reported visible spectrophotometric method for the analysis of aminocrine hydrochloride in creams, jellies and suppositions was studied collaboratively by 8 laboratories. The method is based on extraction of aminocrine hydorchloride into acidic ethanol and its visible spectrum recorded. MVG

2406 El-Sadek (ME), Abdel Latef (HE) and Aboul Khier (AA). Colorimetric determination of terbutaline sulphate and orciprenaline sulphate via nitrosation and difference spectrophotometry. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 568-571

2407 Fisher (MT) and Gurnsey (C). Scheme for validation of an analytical protocol: Semiautomated Kjeldahl nitrogen determination. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 405-409

All the five approaches of Kjeldahl analysis are combined to produce an alternative scheme of validation. The results obtained by this scheme allow the analyst to obtain a performance profile of analytical procedure. This is demonstrated by the assay of nitrogen in biological samples. MVG

2408 Holak (W) and Patel (B). Differential pulse polarographic determination of sulphites in foods: Collaborative study. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 572-578

A differential pulse polarographic (DPP) method for the detn. of 'free' and 'total' sulphite in foods was collaboratively studied. Based on the results the method has been adopted first official action for detn. of total sulphur dioxide in shrimp, orange juice, peas, dried apricots and dehydrated potatoes. MVG

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

2409 Albini (PA), Briggs (DE) and Wadeson (A). Microbial enzymes and their effects on extract recoveries from unmalted adjuncts. **Journal of the Institute of Brewing** 93(2); 1987; 97-104

Detection of Beta-glucan, starch-, protein-, pentosan- and triglyceride degrading enzyme activities in a variety of commercial enzyme preparations was carried out using radial diffusion tests. Some implications of the presence of unexpected enzyme in particular enzymes are discussed. MVG

Amylases

2410 Marsili (RT) and Ostapenko (H). Alpha-amylase assay, and action pattern determination using radioactive substrate, HPLC and a radioactive flow detector. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 304-308

This work was carried out to refine the methodologies for the analysis of Alpha-amylase. By HPLC and a radioactive flow detector/integrator the changes in C_{14} labelled starch substrate and the degradation products were monitored. The results showed that the hydrolysis of the starch was proportional to the enzyme concn. when two commercial preparations of the Alpha-amylase preparations of **B. subtilis** were used. The analytical results showed an average recovery of 101.7 plus or minus 6.5% when the starch was subjected to hydrolysis by amylase. This method was more useful than other colorimetric and viscometric amylase assay procedures. NGKR

Isomerase

2411 Azzi (A) and Niola (I). Characterization of a commercial isomerase. **Industrie Alimentari** 26(6); 1987; 550-552 (It).

Chemico-physical properties and monosaccharide content of a commercial isomerase have been investigated. BV

Ethyl alcohol

2412 Bhatt (S), Rana (RS) and Nain (LR). Ethanol production from mixed fruit juice of damaged guava and banana. **Journal of Food Science and Technology, India** 24(4); 1987; 192-193

Candida krusei isolated from damaged guava and banana was compared with **Saccharomyces cerevisiae** CDRI and **Sacch. cerevisiae** NCIM 3095 at different pH, N and P levels for ethanol production from mixed fruit juice. Fermentation efficiency and ehtanol yield were max. at pH 4.7 for **C. krusei** and pH 5.0 for **Sacch. cerevisiae** CDRI and NCIM 3095. A sugar to N ratio of 12.4:0.14 was optimum for ethanol production by **C. krusei** and **Sacch. cerevisiae** CDRI and 12.4:0.1 by **Sacch. cerevisiae** NCIM 3095. Max. biomass was obtained after 50 h in **C. krusei** (2.8 g/l) and after 35 h in **Sacch. cerevisiae** CDRI NTG (2.1 g/l). Ethanol production was increased upto 55 h in **C. krusei** and upto 35 h in **Sacch. cerevisiae** CDRI NTG. KAR

Fermented products

2413 Suzuki (M), Nakase (T), Daengsubha (W), Chaowsangket (M), Suyanandana (P) and Komagata (K). Identification of yeasts isolated from fermented foods and related materials in Thailand. **Journal of General and Applied Microbiology** 33(2); 1987; 205-220

The paper deals with the identification of 80 strains of yeasts from 39 samples of 29 kinds of fermented food and other related materials in Thailand. The distribution of the yeast species identified from these product is also discussed. MVG

Microorganisms

Algae

2414 Adey (WH). Food production in low-nutrient seas. **BioScience** 37(5); 1987; 340-348

Biomass produced in the ocean without nutrient enrichment can be harvested as algae or as Carribean crabs. BV

Bacteria

Salmonella

2415 Flowers (RS), Klatt (MJ), Mozola (MA), Curiale (MS), Gabis (DA) and Silliker (JH). DNA hybridization assay for detection of **Salmonella** in foods: Collaborative study. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 521-529

A collaborative study by 11 laboratories has been reported to validate DNA hybridization procedure for detection of **Salmonella** in foods (ground pepper, soy flour, dry whole egg, milk chocolate, nonfat dry milk and raw deboned turkey). MVG

2416 Flowers (RS), Klatt (MJ), Robison (BJ), Mattingly (JA), Gabis (DA) and Silliker (JH). Enzyme immunoassay for detection of Salmonella in low-moisture foods: Collaborative study. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 530-535

A modified enzyme immunoassay method for detection of **Salmonella** in foods was evaluated in a collaborative study comprising of all laboratories. MVG

2417 Shashikanth (KN) and Hosono (A). Screening of streptomycin-dependent strains of **Salmonella typhimurium** and **Escherichia coli** for in vitro detection of spice-induced mutagenicity. **Lebensmittel-Wissenschaft und-Technologie** 20(2); 1987; 91-94

A number of streptomycin-dependent strains, namely #510, #4 and #1018 of TA #98, #1, #2, #3 and #7823 of TA 100 (**Salmonella typhimurium**) and #3, #13 and #14 of **E. coli** trp hcr, were screened as indicator bacteria for spice-induced mutagenicity. Two streptomycin-dependent strains of TA 98, namely #510 and 4, exhibited a sharp response with low background for all the spices tested. Strains 1018 and 7823 ranged from positive to slightly positive, whereas strains 13 and 14 of **E. coli** were positive to four spices. **S. typhimurium** (TA 98) failed to exhibit significant mutagenicity either in the presence or in the absence of S-9 activation. Of the 18 spices tested, only fenugreek (methi) was non-mutagenic. Clove and dry-ginger alcoholic extracts, though found positive by disc assay, were completely toxic by the plate method. The remainder of the spices indicated a dose-related response. AS

Streptomyces fradiae

2418 Prapulla (SG), Thakur (MS), Jaleel (SA), Srikanta (S), Prasad (MS), Devi (PN), Ghildyal (NP) and Lonsane (BK). Cultural stability of **Streptomyces fradiae** ScF 5 in production of glucose isomerase: Studies in laboratory and pilot plant fermenters. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(5-6); 1987; 168-171

The studies on morphological, physiological and biosynthetic variations in **Streptomyces fradiae** ScF 5 during scale up trials in 10 and 40 L fermenters for the production of glucose isomerase revealed a highly unstable character of the strain with respect to enzyme production, biomass formation, consumption of acid/alkali for pH maintenance, rate and quantity of glucose and xylose utilization, level of extracellular enzyme in the culture supernatant, degree of foaming and the intensity of pigmentation. The significant variation in these characteristics was also observed when the strain was simultaneously cultured in the fermenter and parallel shake flasks. The consistently inconsistent behaviour of the strain points out the need for an obligatory evaluation of the stability of **Streptomyces** strains before contemplating their use in development of industrial fermentation processes. AS

Fungi

Yeasts

2419 Mittrucker (H). The determination of the reaction enthalpy of microbiological reactions as basis of the design of cooling systems of fermenters. **Lebensmittelindustrie** 34(3); 1987; 119-121 (De).

The observation of the optimum process temp. requires the exact design of the cooling system. Therefore the heat balance must be set up and the reaction enthalpy must be determined. Two examples are described for yeast production. AS

2420 Schmidt (G). Bubbling over with yeast. **Food** 9(5); 1987; 25, 27, 29

Examines the different uses of yeast; traditional inactive yeast products; novel yeast extracts; flavourings containing yeast extract and other inactive yeast products. BV

2421 Tubb (RS). Gene technology for industrial yeasts. **Journal of the Institute of Brewing** 93(2); 1987; 91-96

Yeast genetics is now available as a practical tool for the development of brewing industry practices. The contribution of Brewing Research Foundation work (1978-84) to recent advances is illustrated by the construction of brewing strains with superattenuating (amylolytic) or anti-contaminant properties. Approaches-based on hybridization (by rare mating) or recombinant DNA technology have been evaluated. Techniques developed for (i) gene transfer to brewing strains, (ii) ensuring stable inheritance of novel characteristics and (iii) exploiting the secretory ability of yeast strains, can be widely applied not only with brewing, distilling, baking or wine yeasts, but also in the use of yeasts to produce novel biotechnical products. 'Spin-off' from these studies includes valuable methods for differentiating or enumerating wild yeasts in brewery quality control. AS

BIOTECHNOLOGY

2422 Schmid (RD). Biotechnology: Application to oleochemistry. **Journal of the American Oil Chemists" Society** 64(4); 1987; 563-570

Discusses application of biotechnological methods to oleochemsitry and plant breeding, plant cell cultures, recombinant DNA application, medium chain fatty acids, other fatty acids, biotransformations, lipases, enzymatic fat cleavage, ester synthesis, biotechnological fatty alcohol production and fatty acid biotransformation. BV

TISSUE CULTURE

Nil

FOOD ADDITIVES

2423 Veerabhadrarao (M), Narayan (MS), Kapur (OP) and Suryaprakasa Sastry (C). Reverse phase liquid chromatographic determination of some food additives. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 578-582

Liquid chromatographic methods are described for the separation and detn. of nonnutritive sweeteners, namely, acesulfame, aspartame, saccharin, and dulcin; preservatives such as benzoic acid and p-hydroxybenzoic acid; and caffeine and vanillin in ready-to-serve beverages, ice candy, ice cream, squash beverage, tomato sauce, and dry beverage mix samples. These additives are separated on C_{18} Bandapak C_{18} column using methanol-acetic acid-water (20 + 5 + 75) as mobile phase and detected by UV absorption at 254 nm. Caffeine, vanillin, dulcin, and benzoic acid can be analyzed quickly by using a mobile phase of methanol-acetic acid-water (35 + 5 + 60). Aspartame can be separated in the presence of caffeine and vanillin by using the mobile phase pH 3 acetate buffer-methanol (95 + 5). Retention factors and min. detectable limits are described. Recovery of additives added to the foods named and analyzed by the direct method and by extraction ranged from 98.0 to 100.6% and from 91.6 to 101.8%, resp. KAR

Colorants

Anthocyanins

2424 Jackman (RL), Yada (RY), Tung (MA) and Alex Speers (R). Anthocyanins as food colorants - a review. **Journal of Food Biochemistry** 11(3); 1987; 201-247

This review covers the various factors affecting anthocyanin colour and stability as they are the most promising naturally occurring plant pigments from flowers, fruits and vegetable source that are responsible for red, purple and blue colour. Due to their highly degrading reactive nature they have very limited use and they are susceptible to attach by such compounds like sulphur dioxide, ascorbic acid, hydrogen peroxide and even water. Also the presence of oxygen and various enzymes, high temp. processing are the factors for the loss of colour. It also describes copigmentation and condensation reactions, metal complexing, sugars and their degradation products. Methods for stabilisation of anthocyanins and their commercial use as food colours are indicated. NGKR

Emulsifiers

2425 Sase (H), Watanabe (M), Arai (S) and Ogawa (Y). Functional and sensory properties of meat emulsions produced by using enzymatically modified gelatin. **Journal of Food Science** 52(4); 1987; 893-895

2426 Siripurapu (SCB), Mittal (GS) and Blaisdell (JL). Textural and viscoelastic characteristics of meat emulsion products during cooking. **Lebensmittel-Wissenschaft und-Technologie** 20(2); 1987; 68-73

Textural viscoelastic and creep data for a meat emulsion product with different fat-protein ratios and cooked at various temp. and for various times, were recorded using an Instron Universal testing machine. Creep data were measured for 2 min and a three-element model with a spring and a Kelvin unit in series was found suitable. Correlations among the dependent and independent variables are discussed. Regression models were developed based on a second-order polynomial, modified Arrhenius equation, and on the modified Eyring's absolute reaction rate theory model. The textural properties of sausage changed with increased cooking time and holding time and with decreased meat fat-protein ratio. AS

Flavour

2427 Beauchamp (GK). Recent developments in flavour research. **Food Technology** 41(6); 1987; 74, 124

Briefly discusses the factors influencing flavour preferences in humans. BV

2428 Broekhof (M). Natural flavours - A marketing perspective. **Perfumer & Flavorist** 12(4); 1987; 23-25

2429 Horton (HW). Consumer reaction to flavour innovations. **Food Technology** 41(6); 1987; 80-82, 84

Discusses the increased consumer awareness that affects the new flavours. BV

2430 Manley (CH). Processing and biotechnology as a source of flavours. **Perfumer & Flavorist** 12(4); 1987; 11-22

The most interesting and rapidly growing area in the flavour industry today deals with creation of flavouring and flavouring components from processing and biotechnology. Aspects covered include process flavours, enzymes, biotechnology, regulatory issues and economic issues. BV

2431 McA Craig (AJ). Flavour recovery by the flavourtech recovery system. **Food Technology in Australia** 39(3); 1987; 102-104

This review discusses the process development of a mol. distillation unit incorporating a modified spinning cone column, its use in separation and collection of volatile flavour components from a liquid system, flavour harvesting, and flavour management during conventional processing. NGKR

2432 Ringleib (C). Flavour R & D at a consumer products company. **Perfumer & Flavorist** 12(4); 1987; 1-10

Discusses in-house flavour, concept development, product definition, product development, commercializing the product and flavour research. BV

Taste

2433 Schiffman (SS). Recent developments in taste enhancement. **Food Technology** 41(6); 1987; 72-73, 124

Describes the effect of methyl xanthines (caffeine, theophylline and theobromine), inosine-5′-monophosphate, inosine, amiloride, bretylium tosylate and chemosensory disorders. BV

Stabilizers

Gums

Gum karaya

2434 Bhat (RV), Sesikeran (B), Reddy (CVK) and Radhaiah (G). Toxicological evaluation of gum karaya in rhesus monkeys. **Journal of Food Safety** 8(3); 1987; 161-166

Gum karaya, a smooth nonsticky mucilagenous substance obtained from the trees of **Sterculia urens** is used in food, pharmaceuticals, cosmetics and other industries at various levels ranging from 0.002-0.8% as emulsifying, stabilizing, thickening and bulking agent. In this investigation the histopathological studies on feeding gum karaya to monkeys have been undertaken. The results revealed no evidence of any ill effects of gum karaya when it was fed to rhesus monkeys at the 5% level for 18 wk from the growth pattern, haematological status and histopathological patterns. NGKR

Sweeteners

Aspartame

2435 Graves (DJ) and Luo (S). Decomposition of aspartame caused by heat in the acidified and dried state. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 439-442

L-Aspartyl-L-phenylalanine methyl ester (aspartame) forms a variety of degradation products when heated in an acidified-lyophilized state at 100 C for 24 h in vacuo. In addition to the well-characterized degradation products of aspartame, our results suggest that aspartame can also dehydrate upon heating and that oligopeptides can be generated containing higher ratios of aspartic acid to phenylalanine than the starting material. Aspartame dehydrates to form an anhydro derivative (MW 276) as determined by fast atom bombardment mass spectrometry. Photoacoustic infrared spectroscopy results suggest an anhydride can occur between the Beta-carboxyl group and the peptide linkage upon heating. AS

Cyclamates

2436 Sjoberg (A-MK) and Alanko (TA). Spectrophotometric determination of cyclamate in foods: NMKL collaborative study. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 588-590

In this collaborative study, ethyl acetate is added to extract cyclamate from acidic aqueous solution into water and the cyclamate is then converted to N, N,-dehydrocyclohexylamine by adding excess hypochlorite which is then determined by UV absorption at 314 nm. Six samples with 3 soft drinks and 3 jams with cyclamate levels below 1.50 g/kg were included in the study. The reproducibility coeff. of variation were 6.7% for soft drinks and 4.4% for jams. MVG

Isovanillyl

2437 Chinn (LJ), Eric Walters (D), Williams (K) and Mazur (RH). Isovanillyl sweeteners: Amide analogues of dihydrochalcones. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 409-411

CEREALS

2438 Lauren (DR) and Greenhalgh (R). Simultaneous analysis of nivalenol and deoxynivalenol in cereals by liquid chromatography. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 479-483

A sensitive method is described for detn. of nivalenol (NIV) and deoxynivalenol (DON) in cereals by using reverse phase liquid chromatography and UV detection at 222 nm. The sample is extracted with acetonitrile-water (85 + 15) and an aliquot is purified by passage through a combined column of cation exchange resin and alumina-carbon (20 + 1). Analysis at this stage is possible with some samples but the method recommends passing an aliquot through a carbon minicolumn after evaporation and solubilization in methanol. Interference from coextracted compounds at this point is negligible. Recoveries of both NIV and DON from spiked extracts taken through the full method were in the range 83-94%. The relative standard deviation, was approx. 5% for both NIV and DON. With a 10 μL injection, the min. contamination(3 x signal/noise ratio) able to be detected in cereal samples was about

0.015 µg NIV/g and 0.05 µg DON/g. The cleaned up extracts are also suitable for analysis by gas chromatography. AS

2439 Porter (JK), Bacon (CW), Plattner (RD) and Arrendale (RF). Ergot peptide alkaloid spectra of Claviceps-infected tall fescue, wheat and barley. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 359-361

The specific ergot peptide alkaloids and their relative percentages produced by Claviceps purpurea of tall fescue are compared to the ergot peptide alkaloids produced by the C. purpurea of barley and wheat. In addition these data are compared to the earlier work reported on these alkaloids from endophyte-infected fescue. Tandem mass spectrophotometry was used to chemically separate and compare the ergot peptide alkaloids occurring in the sclerotium of C. purpurea parasitic on tall fescue with those found in this fungus parasite on barley and wheat. The same ergot alkaloids have been found in the claviceps infected wheat and barley but differences are noticed in the alkaloid quantities and these have been compared to the earlier findings in the foliage leaves. NGKR

2440 Prasada Rao (UJS) and Nigam (SN). Gel filtration chromatography of glutenin in dissociating solvents: Effect of removing noncovalently bonded protein components on the viscoelastic character of glutenin. **Cereal Chemistry** 64(3); 1987; 168-172

Changes occurring in the physical character of glutenin as measured by visco-elastograph after removal of non-covalently bonded polypeptides are reported. Amino acid compositions and electrophoretic patterns of various isolated fractions are also described. MVG

2441 Scudamore (KA). Effectiveness of cold solvent extraction systems for the determination of fumigant residues in cereal grains. **Pesticide Science** 18(1); 1987; 33-53

Two alternative cold solvent extraction mixtures, (a) light petroleum distillate (40-60 C boiling range) 0.1M HCl (2+3 by vol) and (b) acetone + water (5+1 by vol) were examined for their effectiveness in extraction of residues of bromochloromethane, 1,1,1-trichloroethane, carbon tetrachloride and 1,1,2-trichloroethylene from cereal grains and rape seed. Apparent recoveries of fumigants from spiked solutions or spiked commodity extracts were generally in the range 90-105%, acetone + water giving the higher results. The rate of extraction of residues from aged samples using either solvent mixture was often slow, with extraction continuing well beyond the recommended standing periods. KAR

Barley

2442 Bhatty (RS) and Whitaker (JR). In vivo and in vitro protein digestibilities of regular and mutant barleys and their isolated protein fractions. **Cereal Chemistry** 64(3); 1987; 144-149

2443 Lehtonen (M) and Aikasalo (R). Beta-glucan in two- and six- rowed barley. **Cereal Chemistry** 64(3); 1987; 191-192

The content of Beta-glucan in 50 six- rowed and 68 two- rowed barley var. was measured. The content in two-rowed barley grown in southern Finland varied between 3.5 and 5.3% of dry matter. The range in two-rowed var. grown in central Finland was 4.09-5.2%. The corresponding ranges in the six-rowed var. grown in southern, central, and northern Finland were 2.8-4.3, 3.3-5.6, and 3.6-4.0%, resp. The average results indicated that the two-rowed var. are somewhat richer in Beta-glucan than the six-rowed ones. The content of Beta-glucan in barley var. was dependent on characteristics of the var., the ear type, and the conditions during growth. AS

2444 Palmer (GH). Influence of cell wall structure in enzymic breakdown of the endosperm of germinated barley. **Journal of the Institute of Brewing** 93(2); 1987; 105-107

Microscopic studies show that the endosperm cell walls are fragmented and degraded by aleurone-secreted enzymes during malting. It is proposed, tentatively, that the degree of enzymic breakdown of the cell walls may be related, in part, to the distribution of plasmodesmata in the cell wall. AS

2445 Sood (DR), Chawla (HKL) and Tek Ram. Potential of huskless and husked barleys for malting. **Bulletin of Grain Technology** 25(1); 1987; 37-43

Malting potential of ten var. each of huskless and husked barley was evaluated by analysing for moisture, thousand kernel wt., crude protein, starch, tannins, true extract, mineral matter, crude fat, germination energy and capacity. Correlation coeff. betweeen malting indices have also been worked out. The results revealed that husked barleys appear to be superior for malting quality on the basis of higher thousand kernel wt., starch content and true extract and lower crude protein and fat contents. NGKR

2446 Stark (JR) and Yin (XS). Evidence for the presence of maltase and Alpha-glucosidase isoenzymes in barley. **Journal of the Institute of Brewing** 93(2); 1987; 108-112

An examination of the development of Alpha-glucosidase and maltase activity (as measured by the hydrolysis of p-nitrophenyl Alpha-D-glucoside and maltose resp.) indicated that two genotypes of Glacier barley had the same general pattern of enzyme development. However, the development of Alpha-glucosidase activity followed a different course from that of maltase activity suggesting that separate enzymes proteins are involved in hydrolysing these substrates. Further evidence that separate enzyme proteins were responsible for hydrolysis of maltose and p-nitrophenyl Alpha-glucoside was obtained by column chormatography of extracts of germinated barley which indicated the presence of two maltases and two Alpha-glucosidases. The maltases and the Alpha-glucosidases differed in mol. wt., pH of optimum activity and in thermostability. When isomaltose was used as a substrate the optimum pH and behaviour on gel chromatography were coincident with that of maltase activity but different from the Alpha-glucosidases. AS

Paddy

2447 Rajendran (G), Anthoni Raj and Iengar (NGC). Effect of pressure parboiling on mycotoxins and aflatoxins. **Bulletin of Grain Technology** 25(1); 1987; 90-91

The effect of pressure parboiling on mycotoxin and aflatoxins in fungal infected paddy was studied. The results showed that while control samples of paddy contained high levels of mycotoxin and aflatoxins the pressure parboiled samples were found to be free from all these toxins. It was found that a min. level of pressure treatment was recommended to be 20 psi for 10 min when the paddy is rendered safe by the destruction of the aflatoxin and mycotoxins. NGKR

Rice

2448 Anand Prakash and Jagadiswari Rao). Use of chemicals as grain protectants in rice storage ecosystem and its consequence. **Bulletin of Grain Technology** 25(1); 1987; 65-69

This review discusses the problems, prospects and consequence of the use of chemicals (insecticides or fumigants) in rice storage; covers various aspects of the chemicals used in storage ecosystem; toxic effects of the chemicals; chemical adulteration; misuse of these chemicals and non-awareness of residues contamination. The need for analytical laboratories education on health hazards, proper handling and use of pesticides, and pure chemicals has been stressed. NGKR

2449 Sidhu (JS) and Bajaj (M). Extended milling of Indian rice. IV. Effect of phytic acid content. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(5-6); 1987; 172-175

The effect of extended milling on the levels of total, phytic, and inorganic P in rice has been reported. In the highly milled rice with 13-17% degree of polish, the total and phytic P contents were reduced by about 70 and 87% resp. 73 and 30% of the total P was present as phytic P in brown rice and highly polished white rice, resp. Although the brown rice is a good source of total P (3.5 mg/g), the nutritional value of highly milled rice is very low (1.0 mg/g) indicating the peripheral distribution of total P in rice kernels. In the highly polished rice about 70% of the total P which is present as non-phytic P, may be available to the humans. AS

Wheat

2450 Joshi (BC), Srivastava (SK), Dwivedi (PK) and Prajapati (SK). Microbial spoilage of flood affected stored wheat. **Bulletin of Grain Technology** 25(1); 1987; 85-87

The impact of rains and flood on stored wheat and also the paddy crops in terms of association of micoflora and aflatoxin has been studied. Microflora isolated included **Aspergillus flavus, Asp. candidus, Rhizopus, Fusarium, Penicillium, Drechslera, Mucor and Absidia**. All the samples were contaminated by aflatoxins B 1 in the range of 8-40 p.p.b and storage fungi were predominant causing discolouration. NGKR

2451 McAuley (JA), Hoover (JLB), Kunkel (ME) and Acton (JC). Relative protein efficiency ratios for wheat-based breakfast cereals. **Journal of Food Science** 52(4); 1987; 1111-1112

This study was to determine the relative PERs for selected wheat based breakfast cereals processed by different methods of heat processing. Male weanling rats were subjected to standard 28-Day PER experiments following AOAC method with 8.5% protein in one of the six wheat based breakfast cereals contained in the diet, wheat flour, whole wheat flour or casein. One of the cereals was an extruded puffed product, three were flaked and toasted cereals and two were extruded cereals. Of the two extruded cereals one was lightly toasted and the other was more heavily toasted. Results showed that cereals processed by treatments that are more heat intensive e.g. puffing or flaking by toasting seemed to produce lower growth rates in rats than those processed by extrusion followed by toasting. NGKR

2452 Rasco (BA), Downey (SE) and Dong (FM). Consumer acceptability of baked goods containing distillers' dried grains with solubles from soft white winter wheat. **Cereal Chemistry** 64(3); 1987; 139-143

Baked goods prepared from whole white wheat distillers' dried grains with solubles (DDGS) were rated by a consumer panel (n = 387). The experimental baked goods contained DDGS as a replacement for 30% (w/w) of the all-purpose flour. Using chi-square analysis, no significant differences ($P<0.05$) were observed between ratings for experimental and control samples of chocolate chip cookies or banana bread. Both experimental and control products were rated as good to excellent. Panel ratings for white bread and whole wheat bread made with 30% DDGS were acceptable to good. The colours of experimental and control breads were significantly different ($P<0.05$; Student's t test); however, the colour of products containing DDGS did not appear to affect overall consumer preference. AS

2453 Renard (C), Robert (P), Bertrand (D), Devaux (MF) and Abecassis (J). Qualitative characterization of the purity of milled durum wheat products by multidimensional statistical analysis of their mid-infrared diffuse reflectance spectra. Cereal Chemistry 64(3); 1987; 177-181

Because assessment of durum wheat semolina purity by the standard ash test has been widely criticized, we attempted to characterize products of a semolina mill by mid-infrared diffuse reflectance spectroscopy, which up to now has met with limited success. Recent technological advances may open new possibilities for this spectral range; new mathematical treatments are reported that extract the main spectral phenomena in a set of spectra. A collection of milled wheat products ranging from very pure semolinas to bran was chosen for this study. Three mathematical treatments (multidimensional statistical analyses) were applied to the spectra to condense the data with minimal loss of information; principal component analysis, morphological anlaysis, and correspondence factorial analysis. By these methods, characteristic wave numbers of the main components of wheat were identified for starch (1,166, 1,102, and 1,066 cm^{-1}), cellulose (1,134 and 1.178 cm^{-1}), noncellulosic cell-wall components (1,730 and 1,594 cm^{-1}), and gluten (1,694 and 1,554 cm^{-1}). Maps showing a separation of three kinds of milled products (semolinas, flours, and brans) and a rough classification of these products according to purity were obtained without biochemical calibration. AS

Wheat flour

2454 Kaufman (SP) and Fennema (O). Evaluation of sulfhydryl oxidase as a strengthening agent for wheat flour dough. **Cereal Chemistry** 64(3); 1987; 172-176

Sulfhydryl oxidase (SO), an enzyme that catalyzes formation of disulphide bonds, was used in trials involving baking (two flour types), mixograph measurements (weak and strong flours), and flour-buffer suspensions to determine whether this enzyme would influence dough rheology. The enzyme was isolated from skim milk membranes using gel exclusion chromatography. SO was tested in the presence of two constituents known to enhance its activity, glutathione disulphide and horseradish peroxidase. 5,5-Dithiobis-(2-nitrobenzoic acid) (DTNB) was used to monitor SO activity during its purification and during subsequent trials with flour and buffer suspensions, with turbidity corrections employed in the latter case. SO had no detectable effect on loaf volume, mixograph measurements (mixing stability, extent of dough breakdown), and the number of free sulfhydryl groups in flour. The inability of SO to strengthen wheat dough is likely attributable to its inability to catalyze formation of disulphide bonds in the systems tested, or its known inability under any circumstances to catalyze thiol-disulphide interchange reactions. AS

2455 Sommer (R). Reconstruction and capacity expansion of wheat flour mills – aspects and experience. **Lebensmittelindustrie** 34(3); 1987; 109-112 (De).

MILLETS

2456 Vimala (V), Kameswari (SL) and Ratnaprabha (C). Milling techniques adopted by tribals of Vizianagaram (District) for various food grains. **Bulletin of Grain Technology** 25(1); 1987; 30-36

Milling techniques adopted by housewives to various grains in the tribal areas of Vizianagaram district in Andhra Pradesh, India have been studied. The most common treatment was found to be boiling and drying the grain before dehusking and application of oil and heat were also followed for pulse milling. Water is sprinkled periodically on Jowar (Sorghum vulgare) and Bajra (Pennisetum typhoideum) for dehusking during hard pounding operation. The yield of the dehusked grain was found to vary between 55 to 75% and the separated husk is used as animal feed and for flooring purpose. NGKR

Corn

2457 Gupta (HO), Singh (J), Ram (PC) and Singh (RP). Chemical and biochemical investigations on normal, chalky and modified opaque-2 strains of maize. **Journal of Food Science and Technology, India** 24(4); 1987; 184-186

Protein, lysine and tryptophan contents of Opaque-2 var. as a group were significantly higher than in the normal type. Differences between chalky and hard-endosperm type in protein and tryptophan contents were not significant; however, it was significant for lysine. Similar trend was also found for chemical score. On an average, total starch content in hard endosperm type was comparable to the normal endosperm types and was distinctly higher than in the chalky types. In vitro protein digestibility for hard endosperm opaque-2 (88.3%) was intermediate between the chalky type (90.5%) and normal types (87.3%). KAR

2458 Krueger (BR), Walker (CE), Knutson (CA) and Inglett (GE). Differential scanning calorimetry of raw and annealed starch isolated from normal and mutant maize genotypes. **Cereal Chemistry** 64(3); 1987; 187-190

Differential scanning calorimetry was used to study gelatinization of laboratory-isolated starch granules from normal and mutant maize var. Samples were studied in their native condition and after annealing by heating at 50 C in excess water for 48 h. Native starches exhibited considerable variation in enthalpy and temp. range of gelatinization in a pattren consistent with the composition and degree of crystallinity of the starch, i.e., starches with the highest amylopectin content (and hence the highest degree of crystallinity) had the highest enthalpy and narrowest temp. range of gelatinization. Annealing caused an increase in enthalpy and narrowing of temp. range for all starches; the extent of these changes was inversely proportional to the degree of crystallinity of the native starch. AS

Corn flour

2459 Mougua (SK). The nutritional and fermentation characteristics of uji produced from dry milled maize flour (Unga baridi) and whole wet milled maize. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(5-

6); 1987; 154-161

Investigates a whole maize wet milling process for production of smooth textured uji similar to one made from **Unga baridi** commercially. The effect of the type of milling on uji fermentation, nutritive value of **uji**, the influence of fermentation on selected nutrients and the cooking characteristics of uji are examined. BV

Corn starch

2460 Inglett (GE). Action pattern of **Bacillus licheniforms** alpha-amylase on ordinary, waxy, and high-amylose corn starches and their hydroxypropyl derivatives. **Journal of Food Biochemistry** 11(3); 1987; 249-258

In this study the actions of a thermally stable bacterial alpha-amylase on ordinary, waxy and high-amylose corn starches and their hydroxy propyl derivatives have been investigated. Depending on the conversion time distinctive patterns of malto-dextrins have resulted and these patterns of amylosis of various starches were derived from HPLC analysis of oligosaccharide compositions produced at different levels of hydrolysis. These results confirmed that **B. licheniformis** amylase degraded a 1% solution of short chain amylose at 40 to give mainly maltopentose and maltotriose. The hydroxypropyl groups on ordinary, waxy and high-amylose starch derivatives greatly hindered alpha-amylosis but the reactions are essentially same. NGKR

Masa

2461 Jackson (DS) and Rooney (LW). Rapid determination of moisture in **masa** with a domestic microwave oven. **Cereal Chemistry** 64(3); 1987; 196-198

Masa is dough-like product prepared by grinding alkali-cooked corn. The moisture content of **Masa** affects the texture of tortillas. Therefore, the feasibility of moisture detn. of **Masa** using an ordinary household microwave oven were evaluated. MVG

Sorghum

2462 Ejeta (G) and Axtell (J). Protein and lysine levels in developing kernels of normal and high-lysine sorghum. **Cereal Chemistry** 64(3); 1987; 137-139

Changes in quality and contents of protein was followed by evaluating the protein and lysine levels in the endosperm and germ fractions of developing kernels of eight high-lysine and normal sorghum var. at 21, 31 and 61 days after flowering. At the late dough stage (31 days after flowering), high lysine sorghum showed higher endosperm protein and lysine content than normal sorghums. The highest endosperm lysine content of all genotypes was also observed at the late dough stage. These finding suggest a nutritional basis for the tradition of farmers in Ethiopia to consume high-lysine sorghum exclusively at mill dough and late dough stages of grain development. MVG

2463 Jayalakshmi (N) and Neelakantan (S). Studies on the acceptability of sorghum - soya blends in South Indian dishes and their keeping quality. **Indian Journal of Nutrition and Dietetics** 24(5); 1987; 136-141

Studies are undertaken on the acceptability of sorghum soabean blended (85:15, 70:30 and 50:50) preparation commonly prepared in S. Indian dietary. Sorghum was cleaned, dried and milled before use and soybean dhal was prepared by cleaning and moistening with water for 30 s and roasted on hot sand at 210 C for 1 1/2 min and the roasted bean passed through dhal mill and husk removed by winnoowing and dhal milled in flour mill. Results revealed that soy flour could be blended with sorghum flour upto 50% level for making deep fat fried products like methu, pakkoda and murukku. For preparation of puttu, laddu, upmav, savai and roti soy flour could be blended with sorghum flour up to 309%. These blends could be stored in tin containers for 2 months. Incorporation of soy flour into sorghum flour improved nutritional and keeping qualities of sorghum flour. NGKR

PULSES

2464 Anita Kataria and Chauhan (BM). Nutritional value and antinutritional factors of amphidiploids (black gram x green gram). **Bulletin of Grain Technology** 25(1); 1987; 3-11

The nutrient composition, protein digestibility, starch digestibility and antinutritional factors of four newly developed strains of amphidiploids (black gram and green gram) have been studied. No significant difference among amphidiploids and their parents for crude protein (22.3 to 23.6%), total available carbohydrates (67.3 to 69.3%), total soluble sugars (7.6 to 8.5%), saponin (2746 to 2972 mg/100 g) and amylase inhibitor activity (154 to 209 units/g). The % of fat (1.7 to 3.3%), ash (2.3 to 3.5%), crude fibre (2.3 to 2.7%), starch (44.0 to 47.9%), non-reducing sugars (7.2 to 8.1%), reducing sugars (311 to 438 mg/100 g), protein digestibility coeff. (49.7 to 55.7%), starch digestibility (18.2 to 23.5 mg maltose released/g meal), trypsin inhibitor activity (973 to 1395 units/g meal), phytic acid (697 to 750 mg/100 g) and total polyphenols (702 to 783 mg/100 g) ranged significantly. All the var. contained haemaglutinating activity and all the quality characteristics of newly developed grains ranged within the limits of their parents. NGKR

2465 Sachdeva (JS) and Sehgal (SS). Natural resistance of pulses to bruchids during storage. **Bulletin of Grain Technology** 25(1); 1987; 58-64

This brief review covers aspects like bruchid attack on pulses during storage viz. morphological characters of pulse like texture and hardness of seed coat, colour, size and curvature of grain, and organic food constituents. Other aspects covered include non-preference; growth and development; and resistance factors including chemical resistance factors. NGKR

2466 Vimala (V) and Pushpamma (P). Storage changes in cookability of pulses from three regions of Andhra Pradesh. **Journal of Food Science and Technology, India** 24(4); 1987; 155-158

Influence of storage for one yr by rural families on the cooking time and water uptake of green gram, red gram, black gram and Bengal gram in three regions (Telangana, Coastal and Rayalaseema) of Andhra Pradesh State (India) has been assessed. The observation was made at intervals of 3 months. At the end of 12 months storage the cooking time was increased by 52% in green gram, 35% in black gram, 31% in Bengal gram and 29% in red gram. With increase in storage period water absorption capacity decreased significantly in all the four pulses from the three regions, % decrease in water absorption was higher in pulses stored in coastal region. The % decrease in wt. during storage was more in green gram, followed by red gram, black gram and Bengal gram. The wt. of 100 grains before cooking decreased significantly in all the 4 pulses and samples from the coastal region showed a higher % decrease in accordance with the level of insect infestation. A slight decrease in vol. of pulses from the three regions was observed at the end of 12 months storage. The cooked wt. and vol. of the 4 pulses decreased progressively as the period of storage increased; largest decrease was found with red gram followed by green gram, black gram and Bengal gram. KAR

Bengal Gram

2467 Sreenivasa (MN) and Rai (PV). Effect of aflatoxin on seed germination of Bengal gram (**Cicer arietinum**). **Journal of Food Science and Technology, India** 24(4); 1987; 187

The effect of aflatoxin at 20, 40, 60, 80 and 100 ug/ml concn. on germination and hypocotyle elongation of 2 var. of Bengal gram (local and Annigeri-1) were tested. With increase in aflatoxin concn. germination was inhibited whereas hypocotyle elongation was unaffected. KAR

Dry beans

2468 Durigan (JF), Sgarbieri (VC) and Almeida (LD). Antinutritional factors and toxicity in raw dry beans (**Phaseolus vulgaris** L.) of 12 Brazilian cultivars. **Journal of Food Biochemistry** 11(3); 1987; 185-200

The toxicity of beans (**Phaseolus vulgaris** L.) from 12 Brazilian cv. was studied by evaluating the protein quality when raw dry bean flours were given in the diets as the only source of protein. The Wistar rats died within 3.8 to 8.4 days whereas when whole seed flour was mixed with casein strong impairment to ration utilisation and animal growth was observed in terms of loss of wt. decreased protein digestibility, biological value and net protein utilisation. The results of the animal experiments revealed that a positive and significant correlation between toxicity and haemagglutination activity was established whereas the antityrptic activity and tannin content did not show any correlation with the toxic effect. This is found to be due to the interaction of lectins with intestinal mucosa and these deterimental effects when prolonged ~~may~~ cause the rats death due to inteference with absorption. NGKR

Green gram

2469 Doharey (RB), Katiyar (RN) and Singh (KM). Ecotoxicological studies on pulse beetles infesting green gram. I. Studies on the seed damage, weight and germination loss caused by pulse beetles in green gram **Vigna radiata** (L.) Wilczek. **Bulletin of Grain Technology** 25(1); 1987; 12-16

The ecotoxicological studies on pulse beetles infesting green gram have been carried out to ascertain wt. loss, seed damage and germination loss caused by pulse beetles **Callosobruchus chinensis** and **C. maculatus** during storage. The **C. chinensis** caused 1.35, 45.82, 83.12 and 99.91% seed damage and 0.62, 16.74, 22.56 and 43.26% wt. loss whereas **C. maculatus** caused 1.57, 90.42, 97.40 and 99.03% seed damage and 1.15, 36.36, 48.84 and 51.91% wt. loss after 30, 60, 90 and 120 days of storage resp. thereby showing that **C. maculatus** caused more loss in wt. than **C. chinensis**. The germination loss also increased gradually with the increase in seed damage and storage period. Hundred per cent loss in viability took place after 90 days in case of **C. maculatus** and 120 days in case of **C. chinensis**. NGKR

2470 Jaglan (RS), Singal (SK) and Chaudhary (SD). Studies on preference of pulse beetle **Callosobruchus chinensis** (L.) to some genotypes of green gram **Vigna radiata** (L.) Wilczek. **Bulletin of Grain Technology** 25(1); 1987; 44-47

Studies have been undertaken on the preference and development of **Callosobruchus chinensis** (L.) on six genotypes of green gram **Vigna radiata** (L.) Wilczek. It is found clear that there were significant differences among genotypes tested in relation to the number of eggs. Min. growth was observed on genotype MH-83-21 whereas max. growth on MH-83-20. On the basis of % adult emergence and growth index, genotype MH-83-21 was observed to be most resistant and MH-83-20, PS-16, MH-309, T44 and MH-83-24 were highly susceptible. NGKR

2471 Uma Reddy (M) and Shobha Reddy (G). Effectiveness of selected plant material as protectants against insect infestation and nutrient composition during storage of green gram (Vigna **radiata**). **Bulletin of Grain Technology** 25(1); 1987; 48-57

The effect of neem leaves (**Azardiracta indica**), country borage (**Colius aromaticus**) leaves and rhizomes of sweet flag (**Acorus calamus**) were tested as protectants against the pulse beetle (**Callosobruchus chinensis**) (all applied individually at 1 and 2% as dust and 0.2 and 0.1% as benzene extract in green gram pulse. This was evaluated in the form of dusts (powder) and benzene extracts as prestorage treatment for green gram. The investigations showed that the sweet flag applied as dust and as benzene extract at both the levels offered best protection against the pulse beetle for 6 months whereas the country borage treatments and neem powder applied at 2% gave moderate protection. It was found in the untreated samples a gradual increase in the pulse beetle population, kernel damage, wt. loss and viability loss with the advancement of storage time and an increase in total N content and decrease in methionine, tryptophan and thiamine content. The organoleptic properties of stored green gram samples were not affected by the treatment with plant products. NGKR

Lupins

2472 Meeker (JE) and Kilgore (WW). Identification and quantitation of the alkaloids of **Lupinus latifolius**. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 431-433

The alkaloids present in the species of lupine **Lupinus latifolius** was found to be responsible along with the alkaloid anagyrine speculated to be teratogen for a human deformity. These alkaloids were extracted by Soxhlet method of extraction which proved less time consuming and more efficient than original method. Six components have been identified by capillary GC/MS from the alkaloid extract. The predominant alkaloid was anagyrine which represented 86% of the total alkaloid and 1.14% of the plant on dry wt. basis. Lupanine, aphylline and 5,6-dehydrolupanine accounted for 6.5, 3.9 and 1.9% of total akaloids resp. along with small amounts of aphyllidine and 4-hydroxylupanine. NGKR

Moth beans

2473 Pawar (VD) and Ingle (UM). Products of quick-cooking moth beans(**Phaseolus aconitifolius** Jacq). II. Phytate phosphorus and minerals. **Indian Journal of Nutrition and Dietetics** 24(5); 1987; 142-146

The effect of quick-cooking process on phytate P and divalent cations like Ca++, Mg++, Fe++ and Zn++ contents in moth bean has been studied by obtaining data on total P, phytate P and nonphytate P of blanched, conventionally cooked, water soaked, water-soaked-cooked and salt-soaked-cooked moth bean samples. Also divalent cations were determined. Results showed that among the salt soaked and cooked beans, 3 h soaked-cooked beans contained less phytate P than 6, 9 and 12 h soaked-cooked beans. By soaking beans in distilled water or mixed salt solution it is possible to remove partially antinutritional factors which is related to the composition of the soaking medium. The divalent cations remained more or less constant after initial leaching in cooking water. NGKR

OILSEEDS AND NUTS

2474 Bhatnagar (S) and Johari (BN). Microbial enzymes in the processing of oilseeds. **Current Science 56(15); 1987; 775-776**

Isolates of **Aspergillus fumigatus, Humicola lanuginosa** and **Sporotrichum termophile** were recovered from deteriorating oilseeds and enzymes were prepared by using YpSS medium. The enzymes were used at 1-3% levels to crushed seeds of cotton, sunflower, soybean and castor and allowed for 8 h at 45 plus or minus 2 C. The recovery of oil increased 2-5% in cotton, 4.2% in sunflower and slight increase in others. MVG

Coconuts

Copra

2475 Kawakishi (S), Saittagaroon (S) and Namiki (M). Dye- and mutagen-binding properties of defatted copra meal and its derived products. **Lebensmittel-Wissenschaft und-Technologie 20(2); 1987; 83-85**

Dye-and mutagen-binding properties of defatted copra meal and its derived products were studied. Defatted copra meal bound most of the red and orange dyes, but did not bind the yellow and blue dyes examined. It also effectively bound some water-soluble mutagens such as AF-2 and aflatoxin B2. Selective removal of protein and lignin from the defatted copra meal resulted in two additional products. The binding abilities of dyes and mutagens to the derived products, suggested that protein and lignin are primarily responsible for the binding property. Carbohydrate did not appear to bind dyes but effectively bound Trp-P-1 and AF-2 among the mutagens. AS

Cottonseeds

Cottonseed flour

2476 Hanumantha Rao (K), Chandrasekhara (HN) and Ramanatham (G). Preparation and nutritive value of protein isolate from cottonseed flour. **Journal of Food Science and Technology, India 24(4); 1987; 190-192**

Protein isolate was prepared from solvent extracted cottonseed flour by alkali peptization method. The extractability of the protein was 73% by the two-stage extraction procedure. The protein isolate had low free gossypol content (< 0.066%) with a protein efficiency ratio of 2.1 and available lysine content of 3.3-3.5 g/16 g N. Colour improved on washing the flour prior to extraction but extractability of protein was reduced to 52%. Further improvement of colour (light yellowish) was achieved by hydrogen peroxide treatment. It was essential to supplement with lysine and methionine to improve the nutritive value of the peroxide treated protein. AS

Groundnuts

2477 Bhavanishankar (TN) and Shantha (T). Natural occurrence of **Fusarium** toxins in peanut, sorghum and maize from Mysore (India). **Journal of the Science of Food and Agriculture** 40(4); 1987; 327-332

Samples of peanut, sorghum and maize were collected from whole sale market for a period of one yr. and analysed for the presence of T-2 toxin diacetoxyscirpenol and zearalenone by thin-layer chromatography, dermal toxicity test and gas chromatography. The possible effects of harvesting season and duration of storage on the occurrence of the toxins were also examined. Results showed that in case of peanut samples 6-9% were found to be poisitive for the toxic trichothecenes (T-2 upto 38.89 mg kg-1; DAS upto 2.03 mg kg-1) whereas 4-8% of sorghum samples contained T-2 upto 15 m kg-1. No toxins were detected in any of the maize samples and zearalenone was not found in any of the samples tested. Generally toxins were found to occur naturally under tropical conditions in India and max. occurrence reported in peanuts and sorghum in the winter period and toxins were found in produce stored for more than a wk. NGKR

Nuts

2478 Bonato (F). Infra-red ~~reasting~~ roasting of nuts. **Industrie Alimentari** 26(6); 1987; 558-562 (It).

Sesame

2479 Taha (FS), Fahmy (M) and Sadek (MA). Low-phytate protein concentrate and isolate from sesame seed. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 289-292

A procedure for the preparation of sesame seed protein products with a low phytate content has been designed by these investigations. It was found that sodium hydroxide solution (0.04M) proved to be the most suitable solvent for sesame protein extracting about 92% of the meal N by counter current extraction using solvent to meal 25:1. A sesame seed protein isolate was prepared by dissolving the protein by counter current procedure and precipitating it at pH 5.4. The resulting protein isolate contained 91.4% protein and was almost free from phytates and a three-stage counter current extraction procedure was used to extract the meal at pH 5.4 resulting in a protein concn. with 68.2% protein and a low phytate content. NGKR

Soybeans

2480 Ambe (S), Ambe (F) and Nozaki (T). Mossbauer study of iron in soybean seeds. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 292-296

Chemical states of iron in soybean seeds cultivated with a nutrient solution containing enriched 57 Fe have been studied by Mossbauer spectroscopy. The spectra showed that in the seeds Fe was found to be in both trivalent and divalent states and in ferric state and the ferrous ions increased in the process of germination of ripe seeds. The ferric ion in the soybean seeds was not identified as a ferric phytate as was reported in case of wheat. More data with model compounds are required to specify the iron complexes in the seeds. NGKR

2481 Das (HK), Tewary (HK), Bandyopadhyay (SK) and Dhote (VH). Parameters in the preparation of a dhal from soybeans. **Indian Food Industry** 6(2); 1987; 62-65

A laboratory process is described for the dehulling of yellow soybeans to yield unbroken splits, their treatment for flavour improvement and tenderising, and solvent defatting to yield a round, pale yellow, bland product of high acceptability, whose cooking time resembles those of common dhals. Experiments that led to each process step are described. Initial roasting of soybeans as an aid to dehulling and flavour improvement was given up in favour of tempering and conditioning. Use of sodium bicarbonate was most effective for flavour improvement, the length of exposure affecting both the time needed for subsequent total oil removal, and surface fissuring. Water imbibition by soya-splits led to an undesirable elongation in shape, and accordingly sodium bicarbonate was employed in a non-aqueous hexane medium. Later 95% alcohol was found even better. Soaking whole soybeans led to a marked reduction in cookability. Rough costing suggests a price of soya dhal about 12.5% greater than that of soybeans themselves. A shaped extruded product of defatted soy flour mixed both with wheat flour and chickpea flour is briefly described. KAR

Soy flour

2482 Kaushik (SK), Chauhan (GS) and Bains (GS). Changes in physico-chemical properties of defatted soy flour during storage. **Journal of Food Science and Technology, India** 24(4); 1987; 159-163

Defatted soy flour was packed in cloth bag, polycoated jute bag and polyethylene bag and stored for 90 days at 22 and 37 C under 54 and 86% RH. Cloth bag packed samples stored at 22 and 37 C under 86% RH developed darker colour and clumpiness along with microbial contamination after 30 and 15 days resp. and the corresponding period for the polycoated bags was 45 and 30 days under similar conditions of storage. Neither clumpiness nor darker colour was observed in soy flour packed in polyethylene bags. At 54% RH none of the samples exhibited any physical changes under different packaging material and at different temp. Soy flour packed in cloth bags showed max. increase in moisture whereas that packed in polyethylene bags exhibited lowest moisture absorption. Water soluble N content during storage increased from an initial value of 2.17 to 3.05% during first 15 days of storage, thereafter it declined to the lowest value of 0.19% depending upon the packaging material and storage condition. Non-protein N content of defatted soy flour increased from 0.15 to 0.38% depending upon the storage conditions and packaging materials. Jute bag stored samples showed max. increase and min. was in polyethylene bag stored samples. The reducing sugar contents increased from 96 to 325 mg maltose/10 g flour during storage depending upon the storage conditions and packing materials. The trypsin inhibitor activity (TIA) increased during storage of defatted soy flour, whereas available lysine content decreased. TIA increase was max. in soy flour stored in jute bags and min. in those stored in polyethylene bags. The max. decrease in available lysine (5.04 to 4.03%) was in cloth bag stored samples. It is concluded that defatted soy flour packed in polyethylene bags and stored at 22 C and 54% RH showed min. changes in their physical and biochemical properties followed by that packed in polycoated jute bags. KAR

Soy proteins

2483 Lei (M-G) and Reeck (GR). Two-dimensional electrophoretic analysis of the proteins of isolated soybean protein bodies and of the glycosylation of soybean proteins. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 296-300

In isolated soybean protein bodies two dimensional electrophoresis was used. It was found that most individual predominant polypeptides of soybean seeds like Beta-conglycinin, glycinin, lectin and kunitz trypsin inhibitor occur in protein bodies. Dansylhydrazine staining of water extracted soybean proteins which had been separated by the above technique showed that not only Beta-conglycinin and lectin but several other proteins of unknown identity are glycosylated in addition to a small quantity of glycinin. NGKR

2484 Mohamed (MO) and Morris (HA). Textural and microstructural properties of rennet-induced milk coagulum as affected by the addition of soy protein isolate. **Journal of Texture Studies** 18(2); 1987; 137-155

Studies were undertaken on the effect of the addition of soy protein on the textural properties and microstructure of reconstituted non fat dry milk coagulum with time after rennet addition using an Instron Universal testing machine with a newly developed test cell and also by scanning electron microscopy. At 5% addition of soy protein firmness of the reconstituted milk solids reduced, water retention increased and microstructure of rennet induced coagulums loosened. As the level of soy protein was increased the effects become more severe. Synerisis was also followed during changes in coagulum firmness. It was found that a coagulum containing upto 10% soy protein was set for about 60 min after rennet addition it had the same firmness as the control at 30 min but it retained more water than the control. The analysis of the textural and microstructural data using Instron test and syneresis test which are simple and practical suggested that these changes were associated with the extent to which casein micelles coalesced during coagulum formation. NGKR

TUBERS AND VEGETABLES

Root vegetables

Carrots

2485 Hoagland (PD) and Pfeffer (PE). Cobinding of bile acids to carrot fiber. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 316-319

Carrot alcohol insoluble residue (AIR) has potential applications in the food industry as a baking ingredient or a meat extender since carrot AIR is found to have appreciable capacity to bind bile acids, the chemical nature of such binding has been investigated. By HPLC method the cobinding of bile acids to fiber has been evaluated and it has been found that the binding order found was chenodeoxychoalate > deoxycholate >> cholate. NGKR

Tubers

Horseradish

2486 Galacci (RR) and Cichowicz (SM). Microscopic detection of potato adulteration of prepared horseradish. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 502-503

A method to detect parsnip or turnip adulteration in prepared horseradish using light microscopy and a starch staining composition is reported. MVG

Potatoes

2487 Worobey (BL), Pilon (JC) and Sun (WF). Mass spectral characterization of a halogenated azobenzene (3,3′-Dichloroazobenzene) from potato peels. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 325-329

The peels from three potato samples were analysed for the presence of 3,3′-dichloroazobenzene and 3,3′-dichlorodiphenyl diazene by extraction with methanol and partitioning against methylene chloride/water and the methylene chloride was exchanged for TMP. The TMP was screened for the presence of 3,3′-DCAB by capillary GC-EC. A peak was identified in all samples as co-chromatographing with a synthesised reference standard of 3,3′-DCAB. GC-MS total ion monitoring (TIM) of the peel extracts confirmed the presence of 3,3′-DCAB. The potential sources and toxicological concerns of 3,3′-DCAB in potatoes have been presented in this paper. NGKR

Sweet potatoes

2488 Victor Wu (Y) and Bagby (MO). Recovery of protein-rich byproducts from sweet potato stillage following alcohol distillation. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 321-325

The effects of commercial pectinases on viscosities of sweet potato slurries before fermentation and on max. ethanol concn. have been studied and compositions of fermentation products from sweet potatoes with normal (18-24% relatively high (27-30%) and very high (35% and up) dry matter contents have been presented. The yield of ethanol from sweet potato is reported to be 1000 gal per acre as compared with 250-300 gal per acre for corn. The viscosity has to be reduced before fermentation for normal and highly dry var. and the yield of ethanol was 90%. After alcohol distillation the residual stillage was separated by screening, centrifuging and filtering. The cake and centrifuged solids are reported to contain crude protein of 22-32% and 42-57% resp. and since they are rich in lysine 4.3-7.6 glysine/16 g of N will find use as valuable protein rich byproducts and will have commercial potential. NGKR

Vegetables

2489 Candlish (JK), Gourley (L) and Lee (HP). Dietary fibre and starch contents of some Southeast Asian vegetables. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 319-321

The richest sources of dietary fibre as well as starch among the 24 vegetables examined were **Pithecellobium juringa** (Stinkbean) **Hibiscus esculentus** (lady's finger) and **Pisum sativum** var. **macrocarpon** (Snow pea). These vegetables are found to be grown extensively and consumed in South East Asia. The method followed for fibre estimation was according to South gate. It was observed that the stinkbean has the largest quantity of total dietary fibre and noncellulosic polysaccharide and is prescribed in view of its cheapness for the patients requiring intake of fibre by the physicians. NGKR

Cucumbers

2490 Geduspan (HS) and Peng (AC). Effect of chemical treatment on the fatty acid composition of European cucumber fruit during cold storage. **Journal of the Science of Food and Agriculture** 40(4); 1987; 333-339

The changes in the lipid fractions of European cucumber fruits after chemical treatment (Butylate dehydroxytoluene and calcium chloride) and cold storage at 4 C have been studied and presented in this paper. The lipids were separated by silicic acid column chromatography and each lipid class monitored by thin layer chromatography and fatty acid analysis performed by gas liquid chromatographic analysis. Results showed that there was no visible symptoms of chilling injury on cucumbers during cold storage but surface pitting and shrinking noticed after fruits being transfered to 20 C. Neutral lipids were found to increase and phospholipids decrease and total lipid content was not found to be affected by chilling or chemical treatment. Lauric and myristic acids were decreased by chilling and chemical treatment, palmitic acid increased with BHT treatment and linoleic acid increased by calcium chloride treatment in each fraction with variations in treatments. The unsaturation ratio of 18-carbon acids was found to increase in total lipids and phospholipids. NGKR

Leafy vegetables

Cabbages

2491 Bardalaye (PC), Wheeler (WB) and Meister (CW). Gas chromatographic determination of cyromazine and its degradation product, melamine, in Chinese cabbage. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 455-457

Tomatoes

Tomato Sauces

2492 Rani (U) and Bains (GS). Flow behaviour of tomato ketchups. **Journal of Texture Studies** 18(2); 1987; 125-135

The flow behaviour of tomato ketchups as influenced by var. composition and processing is characterised. Two commercial cv. Pb chhuhara and Pb kesri (50 kg lots) were taken for cold and hot extraction methods using standard conditions and equipment and these were compared with seven commercial samples manufactured from the same crop. The flow behaviour of the ketchup was measured by Rheotest 2 viscosimeter under controlled temp. Parameters indicative of force required for destruction of network structure, breaking of aggregates viscous flow were obtained. The ketchup samples were analysed for total solids, suspended pulp, soluble pectin reported as anhydrogalacturonic acid. The results showed wide variations in composition. Ketchups of hot break extract produced more pulp and contained more pectin than those of cold break. Homogenization of cold break extract produced ketchup with higher soluble pectin content as compared to control. The soluble pectin in the commercial ketchups varied considerably. It is seen that power law, Casson's equation and Michaels and Bolger model can be used to delineate the fundamental rheological characteristics of tomato ketchups of varying composition. NGKR

FRUITS

2493 Tindale (CR). Shippig container floors. A potential source of chloroanisole contamination in packaged dried fruit. **Chemistry and Industry** (13); 1987; 458-459

Reports contamination of packaged dried fruit with chloroanisoles (2,4,6-trichloroanisole and 2,3,4,6-tetrachloroanisole) during commercial shipment. The shipping container flooring form a potential source of chlorophenols and under suitable conditions musty chloroanisoles are produced. The investigation also indicated that (a) the use of virgin kraft fibre board and other measures introduced by the dried fruit industry have reduced chlorophenol concn; (b) the extremely high levels of and ratio between chlorophenols indicate that a pentochlorophenol-based timber preservative had been used on the container flooring and; (c) the transfer of chlorophenols from the timber flooring into the cartons was due to the presence of free water, which entered the container through a faulty door-seal. BV

Apples

2494 McLaughlin (NB). Statistical models for failure of apple tissue under constant-strain-rate loading. **Journal of Texture Studies** 18(2); 1987; 173-186

It is found necessary to have a good understanding of the mechanism of tissue damage under external forces to apples at every point in the harvesting, handling, storage and transportation process. In order to study this, the normal, two-parameter Weibull and three parameter Weibull probability models were proposed for the strength of apple tissue drawing on previous theoretical work on fibre-reinforced composite materials. Apples of red var. grown in New York were used for tests to verify the models proposed for tissue failure. To test the models failure, stress data were determined for 800 cylinderical specimens of apple tissue in an Instron universal testing machine. The statistical tests showed that the failure stress data fitted the three-parameter Weibull distribution but did not fit either the normal or the two parameter Weibull distribution. It is therefore considered an appropriate probability model for predicting the strength of apple tissue. NGKR

2495 Monico-Pifarre (A) and Xirau-Vayreda (M). Monitoring residues of carbendazim (applied as benomyl) and thiabendazole in Wellspur apples. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 596-598

Wellspur apples were treated post harvest in a bath containing each of fungicides and stored under refrigeration. Whole fruit and pulp were then analysed from 1-200 days. Under the experimental conditions benomyl and thiabendazole were found in the fruits in the following average amounts: 0.44 plus or minus 0.03 and 0.11 plus or minus 0.03 p.p.m benomyl (as carbendazin) and 0.98 plus or minus 0.10 and 0.39 plus or minus 0.10 p.p.m thiobendazole resp. MVG

Guavas

2496 Sharaf (A) and El-Saadany (SS). Biochemical studies on guava fruits during different maturity stages. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(5-6); 1987; 145-149

Oranges

2497 O'Mahony (MAPD) and Goldstein (LR). Methods for sensory evaluation of Navel oranges treated with electron beam irradiation. **Lebensmittel-Wissenschaft und-Technologie** 20(2); 1987; 78-82

Navel oranges from California were given post-harvest doses of electron beam radiation of 33-50 krad (0.33-0.5 kGy); they were compared with nonirradiated controls for visual appearance, flavour by mouth, odour, taste and taste after gymnema sylvestre. Practised judges were used as an analytical tool, with min. cross-sensory interference, while untrained judges were used to determine whether changes might be distinguished by 'non-experts'. Irradiated oranges suffered more from surface pitting and their juice could be distinguished from control juice in terms of flavour by mouth, odour, taste and tastes other than sweetness. Some samples of untrained judges were also able to distinguish the juice under ordinary consumption conditions. AS

Quinces

2498 Winterhalter (P), Lander (V) and Schreier (P). Influence of sample preparation on the composition of quince (**Cydonia oblonga** Mill.) flavour. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 335-337

The importance of the isolation technique used for the results obtained by chromatographic and spectroscopic techniques has been demonstrated. The volatiles of quince fruit were studied by standard controlled capillary gas chromatography and combined capillary gas chromatography, mass spectrometry using high vacuum distillation - extraction and simultaneous distillation extraction. The results pointed out that the quantitative composition of quince flavour will be further changed if instead of the juice quince pulp is used for simultaneous distillation extraction sample preparation. HRGC and HRGC-MS after SDE of juice volatiles led to 3,4-didehydro-Beta-ionol and a number of bicyclononaes. The potential chemical pathways yielding the different results are presented in this paper. NGKR

CONFECTIONERY, STARCH AND SUGAR

Starch

2499 Pearce (LE), Davis (EA), Gordon (J) and Miller (WG). Stearic acid-starch interactions as measured by electron spin resonance. **Cereal Chemistry** 64(3); 1987; 154-157

Sugar

2500 Chen (CS). Calculation of water activity and activity coefficient of sugar solutions and some liquid foods. **Lebensmittel-Wissenschaft und-Technologie** 20(2); 1987; 64-67

Raoult's law of water activity and the modified equation of Schwartzberg were applied to study the water activity of various sugar solutions, skim milk, coffee, beverage and fruit juice conc. The deviation from ideality is attributed to the solvation (or association) of water molecules by the solutes and is characterized by the activity coeff. Gamma which decreases with increasing concn. The value of Gamma is close to unity for most sugar solutions with concn. up to 40% by wt. Equations for calculating water activity from the wt. percentage are presented. The water activity values calculated using the effective mol. wt. estimated by the freezing-point depression method, agree well with the corresponding data measured by electric hygrometers. AS

Glucose

2501 Hendrickx (M), Ooms (C), Engels (C), Van Pottelbergh (E) and Tobback (P). Obstruction effect of carrageenan and gelatin on the diffusion of glucose. **Journal of Food Science** 52(4); 1987; 1113-1114

From an experimental set up with boundary conditions of an extended initial distribution the diffusion coeff. for glucose in high K-content carrageenan gels were determined as a function of polymer concn. The data are evaluated according to the well known equations on the conduction in heterogeneous systems. It is concluded that both hydrocolloids affect diffusion mainly because of an obstruction effect. In this phenomenon the contribution of the hydration sphere seems to be more important than the polymer itself. Hydration are calculated to be about 5.0 and 1.90 g of water per gram of dry polymer resp. for carrageenan and gelatin. AS

Honey

2502 Allegretti (M), Ambrosoli (G) and Cantoni (C). Detection of isoglucose in honey. **Industrie Alimentari** 26(6); 1987; 566-573 (It).

BAKERY PRODUCTS

2503 Knorr (D). Compressibility of baked goods after carbon dioxide atmosphere processing and storage. **Cereal Chemistry** 64(3); 1987; 150-153

Compressibility of baked goods stored in pure carbon dioxide and processed and stored under carbon dioxide or air atm. was evaluated. Results from storage tests indicated that carbon dioxide significantly decreased compressibility of French bread, white bread, and lean formula baked goods compared to air-stored samples. Fermentation and baking of enriched white bread dough under carbon dioxide modified atmosphere also resulted in softer breads than air-processed samples, especially when no relative humidity control was maintained during storage. Lower water activity values resulted when bread samples were stored in air without humidity control as compared with carbon dioxide-stored goods. AS

Bread

2504 Hung (TT), Seib (PA) and Kramer (KJ). Determination of L-ascorbyl 6-palmitate in bread using reverse-phase high-performance liquid chromatography (HPLC) with electrochemical (EC) detection. **Journal of Food Science** 52(4); 1987; 948-953

In this study a new procedure for the quantitative detn. of ascorbyl palmitate (AP) was developed which has advantages over other methods: 1) no Alpha-amylase digestion of bread crumb was needed; 2) Electrochemical (EC) detector was about 5 times more sensitive than UV detector; 3) AP was more stable in the new extraction medium than in the phosphate buffer used in the past; and 4) the ester group of AP did not migrate or exchange with other hydroxyls on the ascorbate molecule as it apparently did in the phosphate buffer. NGKR

2505 Koch (RL), Seib (PA) and Hoseney (RC). Incorporating L-ascorbyl 6-palmitate in bread and its shortening-sparing and anti-firming effects. **Journal of Food Science** 52(4); 1987; 954-957, 974

L-ascorbyl 6-palmitate (AP), a GRAS food additive used to preserve oils and emulsify food colours has been incorporated in bread doughs in shortenings and comparative studies on AP and other additives for their shortening-sparing and crumb softening effects carried out. Results showed that compared to a mixture of 0.38% AP and 3% shortening or a mixture of 0.5% monodiglycerides and 3% shortening, AP alone at 0.38% in bread gave shorter crumb after 1-5 days storage at 25 C; without shortening loaves with AP gave better grain than other surfactants. NGKR

2506 Kuracina (TA), Lorenz (K) and Kulp (K). Starch functionality as affected by amylases from different sources. **Cereal Chemistry 64(3);** 1987; 182-186

Effects of three types of amylase (Alpha-amylases (1,2 or 8 S KB units per gram) from bacterial, fungal and cereal sources) on starch properties and concomitant effects on bread quality were evaluated. As the interfering secondary activities, which are common in commercial enzymes, were eliminated by experimental design, the observed changes were attributable to amylase activity only. These were: the changes in starch properties mainly solubility at 70 C and pasting properties, indicating a slight loss in thickening power; changes in starch appeared to be limited to amorphous region of the granules; changes in starch were reflected in certain improvements in bread volume, texture and grain; and effects of over treatment with bacterial amylase were caused by the changes in the starch. MVG

Cakes

2507 Cauvain (S). Let them eat cake...especially if it's low fat. **Food** 9(8); 1987; 37-39

Covers functions of fat, ways of reducing the fat content in cake, fruit cake and low calorie products. BV

Cookies

2508 Doescher (LC), Hoseney (RC) and Milliken (GA). A mechanism for cookie dough setting. **Cereal Chemistry** 64(3); 1987; 158-163

The mechanism by which cookie doughs stop spreading was studied and the flour fraction responsible for differences in soft wheat flour quality was identified. Results showed that when cookie dough is mixed, flour protein becomes hydrated but does not expand because it is below glass transition temp. During heating the dough flows until the flour undergoes an apparent glass transition that allows it to expand and form a continuous matrix. As a result, the viscosity increases, causing the cookie dough to stop spreading. The glass transition temp. was not the same for hand and soft wheat flour and hence the differences between these flours. MVG

2509 Doescher (LC), Hoseney (RC), Milliken (GA) and Rubenthaler (GL). Effect of sugars and flours on cookie spread evaluated by time-lapse photography. **Cereal Chemistry** 64(3); 1987; 163-167

Time-lapse photography was used to study the rate of expansion (spreading rate) and setting time during baking of cookie dough prepared with different sugars and flours. The type and the concn. of sugar used affected the spreading parameters. A combination of expansion rate and setting time determined cookie diameter. Among soft wheat flours, variation existed in set time and expansion rate. Rate of expansion was strongly correlated to cookie diameter (r = 0.90). In addition, set time significantly affected final cookie diameter (r = 0.50). Protein content was significantly correlated to expansion rate (r = -0.37) and to cookie diameter (r = -0.31). Alkaline water retention capacity of 45 soft wheat flours was lower than that usually reported but was significantly correlated to cookie diameter (r = -0.71). AS

Dough

2510 Nout (MJR) and Creemers-Molenaar (T). Microbiological properties of some wheatmeal sourdough starters. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(5-6); 1987; 162-167

The microbiological properties of two Dutch commercial wheatmeal sourdough starters, A (wheatmeal/water ratio 1.25, no salt) and B (wheatmeal/water ratio 1.54, 1.5% NaCl) were investigated. A contained **Lactobacillus brevis** var. lindneri II and **L. sanfrancisco** (log N lactobacilli 7.7) and **Saccharomyces exiguus** (log N 7.0). In B, only L. **brevis** var. Lindneri II (log N 9.0) was detected, and a small population of **Sacch. exiguus** (log N 1.5-4.5). After 7 h fermentation at 25 C, both starters reduced the dough pH till 3.8-4.0, with lactate/acetate ratios of 3.7 and 3.8, respectively. The microbiological stability of starter B against contaminations with commercial and maltose-grown baker's yeast (**Sacch. cerevisiae**) was studied. **Sacch. cerevisiae**, when added at a level equal to that of the resident sourdough yeast, could be detected after fermentation of the contaminated dough, but was eliminated after fermentation of a dough made with the contaminated dough as a starter. Successive populations of **Lactobacillus** spp. and yeasts were identified during a 10-week development period of a new wheatmeal sourdough starter. The initial community containing **L. plantarum**, **L. brevis**, **L. buchneri**, **L. cellobiosus**, **Sacch. cerevisiae** and **Torulaspora delbruckii**, was reduced to only three species after 7 wk (20 dough transfers), viz. L. **brevis** var. **lindneri** II, **L. sanfrancisco** and **Torulaspora delbruckii**. AS

Muffins

2511 Cady (ND), Carter (AE), Kayne (BE), Zabik (ME) and Uebersax (MA). Navy bean flour substitution in a master mix used for muffins and cookies. **Cereal Chemistry** 64(3); 1987; 193-195

A master mix was developed with levels of 0, 25 and 35% whole, dehulled navy bean flour substituted for all-purpose wheat flour. Effects of navy bean flour substitution on the physical and sensory qualities of pumpkin spice muffins and oatmeal drop cookies were investigated. A high-quality muffin was produced with no significant differences ($P < 0.05$) between controls and 25 and 35% substitution levels in all parameters investigated. Whole, dehulled navy bean flour substitution in oatmeal cookies did not significantly ($P < 0.05$) affect objective tenderness, spread, colour or sensory colour, appearance, and flavour, but did significantly ($P < 0.05$) affect sensory texture and general acceptability. Incorporation of navy bean flour into a master mix is a feasible way to produce quality products with increased protein and mineral contents. AS

MILK AND DAIRY PRODUCTS

2512 Pal (D) and Cheryan (M). Membrane technology in dairy processing. Part I. Reverse osmosis. Indian Dairyman 39(6); 1987; 251-267

Reverse osmosis (RO) method of concn. of milk for the production of various milk products is described. By this lactose can be easily produced from RO concentrated unfiltered cheese/casein whey. Besides savings in energy, RO process imparts minimal cooked flavour and protein denaturation due to low temp. employed. The nutritional and functional properties of milk constituents are relatively unaffected.

After briefly explaining the fundamentals of RO the authors indicate the separation mechanism, and application of RO in the concn. of whey, ultrafiltration permeate whole milk, and skim milk. The products that could be prepared from the whole milk and skim milk have also been described. MVG

2513 Zickrick (K) and Gehrke (K). About the completion of microbiological indices for the resistance test of mesophilic acidifying cultures in the dairy industry. **Lebensmittelindustrie** 34(3); 1987; 125-127 (De).

The authors introduce two methods of the detn. and valuation of the resistance behaviour of mesophilic acidifying cultures in the dairy industry. One of them is based on the temp. range from 21...37 C and is named as resistance number at breeding temp. The other method has as basis the load capacity of twelve chemically defined substances. For it the authors propose the designation 'chemical resistance index'. Both the methods are a valuable completion of the phenol resistance test after Maxa and Teply. The simple examinations can be carried out in the laboratories of the producers and users of the cultures. AS

Milk

2514 Abu-Lehia (IH). The use of the Hellige turbidimeter in determining the fat content of low-fat milk samples. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(5/6); 1987; 134-139

A turbidimetric method was established for the detn. of fat content in low-fat milk samples (less than or equal to 1%) using dispersion with urea (10 M). The major step involved was a disaggregation of protein to reduce the turbidity. The method is adaptable to routine analysis. Readings from the light disc filter to a Hellige Turbidimeter were used to estimate fat contents in either homogenized-pasteurized or raw milk samples. High reproducibility was obtained for multiple sample analyses. There was an excellent correlation coeff. (r = 0.97) between the fat content as measured by the Majonnier method and by Turbidity reading (T_o). The regression coeff. for T_o of homogenized-pasteurised and raw milk samples were 37.6 and 22.1 resp. This method might also be used for the detn. of fat in whole milk samples after dilution with skim milk to lower the fat content to less than or equal to 1%. AS

2515 Des Raj and Singhal (OP). Effect of formalin on the Gerber fat test. **Journal of Food Science and Technology, India** 24(4); 1987; 183-184

Formalin was added at 0.1, 0.2, 0.3 and 0.4% levels to 7% fat standardised buffalo milk and were analysed for fat by the Gerber and Rose-Gottlieb methods before and after treatment and storage at 22 and 32 C hydrometer readings. Formalin at all the levels did not affect the Gerber fat values of the milk having hydrometer readings upto 27, 25, 23 and 22 C; thereafter, the fat values decreased with the increase of hydrometer reading. At 32 C hydrometer reading, the fat values were 0.5, 1.2, 2.0, and 3.0% less in milk containing 0.1, 0.2, 0.3 and 0.4% formalin, resp. Storage of 0.4% formalin treated milk showed, when tested by Gerber or Rose Gottleib method a slight decrease in fat content after 30 days of storage. KAR

2516 Frede (E) and Thiele (H). Analysis of milk fat by HPLC. **Journal of the American Oil Chemists" Society** 64(4); 1987; 521-528

A routine method for HPLC analysis has been developed which takes into account the specific phenomena of this complex and far-ranging system of triglycerides. MVG

2517 Kailasapathy (K) and Wijayakanthan (S). A study of the microflora at various stages of processing of fluid milk in Sri Lanka. **Journal of Food Science and Technology, India** 24(4); 1987; 163-168

A study was undertaken to ascertain the growth of microorganisms in milk at various stages of processing. Although raw milk as purchased had a total viable count of 10^6 to 10^7 /ml, processed milk gave a total viable count of $< 5 \times 10^4$ / ml. **E. coli** was present in raw milk as well as in some milk samples which were drawn from various points in the processing line. **Salmonella** was not present at any stage of processing. Bottles washed in washing machines showed lower microbial counts than those from the crates. Washed bottles from the crates were also contaminated with **E. coli**. Poor personal sanitation was observed in employees. Tap water used was free from **E. coli** and showed very low presumptive coliform counts. Swabs from various points in the processing line showed that microbial counts were greatly reduced by sterilization. However, the pipelines and the rubber washers showed substantial microbial load which indicated need for further sterilization. AS

2518 Korolczuk (J) and Maubois (J-L). Computerized viscometric method for studying rennet coagulation of milk. **Journal of Texture Studies** 18(2); 1987; 157-172

The effect of commercial rennet coagulation of the reconstituted milk obtained from commercial spray dried skim milk powder on the viscosity changes was studied by using a viscometer (Rheomat-30) connecting with a microcomputer (Apple II plus) through the interface: analog/digital convert (MID 1612 MI). An equation describing the evolution of the viscosity as a function of time has been drawn. With this equation it is sufficient to know the initial and max. viscosity level to be able to reproduce the viscosity vs time curve. NGKR

Milk products

2519 Rajorhia (GS) and Sen (DC). Problems of milk sweets trade in India. **Indian Dairyman** 39(6); 1987; 283-287

Milk sweets trade in shops has been growing steadily in India and offer a major health hazard in view of the bad condition of milk handling, processing and marketing. This survey reports the quality problems like sensory, chemical and microbiological properties of sweets observed in the market. KMD

Cheese

2520 Jameson (GW). Dietary cheeses: low fat, low salt. **Food Technology in Australia** 39(3); 1987; 99-101

This review discusses the potential for increasing dietary cheese manufacture and its economic benefits with high returns, saving of fat and its diversion for use in other products and new markets. This covers various aspects of reduction of salt levels in cheese, reduction of fat levels in cheese, changes in Australian Food regulations for definition of cheese allowed additives and schedule of named cheeses. NGKR

2521 Marcy (G) and Bockemuhl (J). On the importance of **Listeria monocytogenes** in cheese and other foodstuffs. **Deutsche Lebensmittel-Rundschau** 83(7); 1987; 219-220 (De).

2522 Saito (I), Oshima (H), Kawamura (N), Uno (K) and Yamada (M). Determination of sorbic, dehydroacetic, and propionic acids in cheese b liquid chromatography and gas chromatography. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 507-509

The volatile acids are separated from cheese by stea distillation and sorbic acid and dehydroacetic acid are determined b reverse phase liquid chromatography. After the distillate is acidifie with formic acid, propionic acid is determined by gas chromatograph with flavour ionisation detector. MVG

Cheese whey

2523 Pallavicini (C) and Trentin (G). Partial characterization of th coprecipitates obtained from cheese whey-soy protein mixtures treate with papain. **Lebensmittel-Wissenschaft und-Technologie** 20(2); 1987 74-77

A partial characterization was made of the coprecipitate obtained from cheese whey-soy protein mixtures, adjusted to pH 7.5 and the treated with papain for 4 h at 37 C. When examined by PAGE, it was found to be made up of high-mol.-wt. components which failed to enter the separating gel and five additional, spaced bands. Results of gel filtration experiments confirmed the presence of large-sized components. Sodium dodecyl sulphate slab gel electrophoresis studies indicated that the polymerized product consists of proteins and protein fragments with mol. wt. ranging from about 10,000 to 30,000. The association of these components to form the coprecipitate is thought to be a consequence of hydrophobic and disulphide bond formation, following papain hydrolysis. The polymerized product showed better water solubility between pH 2 and 6 than the initial soybean proteins. AS

Curd

2524 Gouda (A) and El-Shabrawy (SA). Microstructure and some properties of curd made with calf rennet, Rennilase and Suparen rennets. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(5/6); 1987; 129-133

Calf rennet (CR), Rennilse (RR) and Suparen (SR) were used to produce cheese curd using the same milk for each. The microstructure of the curd was examined by transmission electron microscopy (TEM), the firmness and syneresis of the curd were also determined, 30 and 45 min after adding the coagulants to the milk. The aggregation of the casein micelles were more pronounced and more compact in curd made with CR rather than that made with RR or SR. The curd of CR after 30 min was relatively firmer and less in syneresis than with the other two rennets. However, these differences were not quite clear after 45 min. Using these fungal preparations more time may be needed to reach a reasonable curd firmness. AS

Ice cream

2525 Wittinger (SA) and Smith (DE). Adaptation of instron to determine the surface tension of ice cream mix. **Journal of Food Science** 52(4); 1987; 1117, 1119

This study was undertaken to compare surface tension of ice cream mix by using Instron with an accepted procedure obtained by measuring with Cahn electro balance by Dunowry method. Results indicate that the method developed for the Instron gave results similar to the Cahn electro balance procedure but also were more precise. NGKR

Whey

2526 Hayashi (R), Kawamura (Y) and Kunugi (S). Introduction of high pressure to food processing: Preferential proteolysis of Beta-lactoglobulin in milk whey. Journal of Food Science 52(4); 1987; 1107-1108

It has been found that protease digestion under controlled pH temp. and solvent composition is a versatile tool in modification and preparation of food proteins. Pressurization should now be added as an additional factor permitting the enhancement of enzymatic proteolysis of particular proteins. For example decolourisation of hemoglobin (a byproduct available from meat industry) deodorisation of particular proteins and solubilisation or modification of fresh proteins could be successfully attained by partial proteolysis at suitably selected pressure, pH, duration of proteolysis and kind of protease. This technique could also be extended to improve the functional properties of food and food ingredients including texture and emulsifying, whipping and dough forming properties. NGKR

2527 Jelen (P), Currie (R) and Kadis (VW). Compositional analysis of commercial whey drinks. Journal of Dairy Science 70(4); 1987; 892-895

Results of detailed chemical analyses and other tests carried out with 6 different commercial European whey beverages are reported. MVG

Milk proteins

Casein

2528 Bercovici (D), Gaertner (HF) and Puigserver (AJ). Transglutaminase-catalyzed incorporation of lysine oligomers into casein. Journal of Agricultural and Food Chemistry 35(3); 1987; 301-304

Guinea pig liver transglutaminase is found to be useful to incorporate efficiently lysine and lysine oligomers into casein since as much as 5 mol. of di-to tetra lysine was conjugated to the protein. Incorporation of lysine oligomers containing more than four residues increased largely cross-link formation via intermolecular isopeptide bonds with a subsequent decrease in the reaction yield. These results indicate that introduction of polysyl units at glutamines in casein by using transglutaminase can lead to a new type of cross linked protein. NGKR

2529 Yen (G-C) and Lai (Y-H). Influence of antioxidants on Maillard browning reaction in a casein-glucose model system. Journal of Food Science 52(4); 1987; 1115-1116

The influence of various antioxidants like Alpha-tocopherol, BHT, BHA or propylgallate but not ascorbic acid in mixtures of casein and glucose model systems on the Maillard reaction was studied as this non-enzymatic browning reaction greatly influences the quality of processed foods. Mixtures of casein and glucose with and without antioxidants were prepared to give a moisture content of 11% and stored at 37 C under 60% RH for 0-60 days. The effects of antioxidants on the Maillard reaction were monitored by browning available lysine and furosine level. It was found that browning decreased with the addition of Alpha-tocopherol, BHT, BHA or propyl gallate but not ascorbic acid in mixtures stored for 2 months. All antioxidants improved the retention of available lysine and lowered the concn. of furosine compared to the control. NGKR

MEAT AND POULTRY

Meat

2530 Kondaiah (N) and Panda (B). A semi-modern abattoir concept for hygienic meat production. **Indian Food Industry** 6(2); 1987; 58-61

2531 Sen (NP), Baddoo (PA) and Seaman (SW). Volatile nitrosamines in cured meats packaged in elastic rubber nettings. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 346-350

The use of elastic rubber nettings in packaged, cured meats can lead to the formation of nitrosamines in the finished meat products mainly N-nitrosodiethylamine and N-nitrosodi n-butyl amine. Since both these nitrosamines are reported to be potent carcinogens in wide range of animal species it would be advisable to reduce the concn. of these chemicals in such meat products as low as technically feasible. Perhaps the use of netties made from improved rubber or alternative materials might help resolve the problem and adequate precautions should be taken while working with these chemicals and further research along these lines is urgently needed. NGKR

2532 Slattery (WJ) and Sinclair (AJ). A comparison of electrophoretic techniques for the species identification of meat. **Food Technology in Australia** 39(3); 1987; 105-108

The usefulness of the isoelectric focusing (IEF) test was compared in this study with the lactate dehydrogenase (LDH) isoenzyme test for the specification of meat from a number of different species belonging to similar animal groups. The results showed that in contrast to IEF, the staining for LDH isoenzymes after electrophoresis is quick, comparatively inexpensive and capable of differentiating meat samples into species grouping, whereas the IEF technique could be useful in identifying individual species within families or genera. NGKR

Beef

2533 Bianchi (MA), Pilosof (AMR) and Bartholomai (GB). Influence of soy protein and NaCl on the rheological properties of beef, pork or chicken muscle homogenates. **Journal of Food Science** 52(4); 1987; 890-892

Yield stress, consistency index, and flow behaviour index of homogenates containing soy protein decreased in value with NaCl addition but the magnitude of the decrease was lower when meats were present compared to the homogenate containing only soy proteins. NGKR

2534 Chu (YH), Huffman (DL), Trout (GR) and Egbert (WR). Colour and colour stability of frozen restructured beef steaks. Effect of sodium chloride, tripolyphosphate, nitrogen atmosphere, and processing procedures. **Journal of Food Science** 52(4); 1987; 869-875

Studies were undertaken to examine the effect of mixing and grinding, mixing under a nitrogen atm., tempering and addition of sodium chloride and sodium tripolyphosphate on the discolouration of restructed beef steaks initially and during frozen storage and investigate the mechanism by which sodium tripolyphosphate reduces the discolouration rate of restructured steaks. Results showed that mixing and grinding had the greatest effect on the initial amount of discolouration of restructured beef steaks. NGKR

2535 Clarke (AD), Means (WJ) and Schmidt (GR). Effects of storage time, sodium chloride and sodium tripolyphosphate on yield and microstructure of comminuted beef. Journal of Food Science 52(4); 1987; 854-856

Cook loss, pH and microstructure of comminuted beef made with four NaCl (1.3, 2.0, 2.6, 3.3%) and two sodium tripolyphosphate levels (0, 0.4%) were evaluated. Scanning electron micrographs showed that samples with low cook on had a fine protein matrix. NGKR

2536 Cronlund (AL) and Woychik (JH). Solubilization of collagen in restructured beef with collagenases and Alpha-amylase. Journal of Food Science 52(4); 1987; 857-860

Three microbial collagenases were evaluated for their ability to degrade collagen structure in a restructured beef product. The present study showed that collagenases from various microorganisms and in differing states of purity could function in a meat product and improve tenderness. NGKR

2537 Hoelscher (LM), Savell (JW), Harris (JM), Cross (HR) and Rhee (KS). Effect of initial fat level and cooking method cholesterol content and caloric value of ground beef patties. Journal of Food Science 52(4); 1987; 883-885

The ground beef patties formulated to contain 0, 5, 10, 15, 20, 25 or 30% fat were either broiled or pan fried for a predetermined time and then frozen. Results showed that regardless of the difference in initial fat level (0-30%) the cholesterol content of the final cooked product may not be different and does not lower cholesterol by consuming lean or extra lean ground beef. Calorie content of cooked patties was linearly related to fat content of the original patties. NGKR

2538 Miller (MF), Davis (GW), Williams (ACJr), Ramsey (CB) and Galyean (RD). Palatability and appearance traits of beef/pork meat patties. Journal of Food Science 52(4); 1987; 886-889

Beef/pork blends of ground meat were stored at -27 C for either 14 or 150 days. Storage time decreased overall desirability scores of blends made with 20% pork fat and 80% youthful beef lean. No differences were found for flavour or overall desirability scores within the 14-day storage treatment. Results indicated beef/pork patties containing 40-80% mature lean and a min. of 10% beef fat were equal to all beef controls (100% beef patty) for visual and palatability characteristics. NGKR

2539 Molins (RA), Sandoval (AE), Olson (DG), Rust (RE) and Knipe (CL). Microbiology of a ham-type product made from soy-extended cured beef and inoculated with Clostridium sporogenes PA 3679. Journal of Food Science 52(4); 1987; 851-853

The study undertaken to determine the microbiological quality and shelf life of a new ham type beef product formulated with varying levels of textured soy protein and stored at refrigeration temp. showed that product shelf life was > 3 wk at 5 C and 2 wk at 8-10 C and no microbiological effects could be attributed to the level of soy protein. NGKR

2540 Seman (DL), Moody (WG), Fox (JD) and Gay (N). Influence of hot and cold boning on the palatability textural and economic traits of restructured beef steaks. Journal of Food Science 52(4); 1987; 879-882

Steaks containing 0.01% BHA, 0.75% NaCl and 10% fat we
fabricated from various carcasses. Research was conducted to evalua
the effects of boning method on the palatability and textural chara
teristics of restructured beef steaks. No differences were found
juiciness, tenderness, flavour desirability, amount of connecti
tissue or cooking loss due to boning time. NGKR

Cattle

Bovines

2541 Bernal (VM) and Stanley (DW). Stability of bovine muscle connecti
tissues. Journal of Food Science 52(4); 1987; 876-878

The susceptibilities of various fractions from beef muscle
degradation by a collagenase preparation were tested. The differenc
noticed in the stability of various fractions was related to the ty
of structural arrangement, collagen composition and the noncollageno
components present in the connective tissue fractions. NGKR

2542 Swatland (HJ). Effect of excitation wavelength on the separation
types I and III collagen by fiber optic fluorimetry. **Journal of Fo**
Science 52(4); 1987; 865-868

The fluorescence of bovine tendon and adipose tissue and pur
fied types I and III collagen was measured with fiber optic
Fluorescence of Type I collagen was stronger than for Type III coll
gen over a range from 410 to 470 nm. Around 510 and 520 nm howeve
both type I and type III collagen exhibited a similar degree of wea
fluorescence. NGKR

Pork

2543 Reitmeier (CA) and Prusa (KJ). Cholesterol content and sensory analy
sis of ground pork as influenced by fat level and heating. Journal
Food Science 52(4); 1987; 916-918

In the raw state low fat ground pork contained less cholester
than high fat ground pork whereas cooked pork contained similar cho
lesterol contents among fat levels studied. Cholesterol content
the cooking drip was directly related to cholesterol loss from pattie
during heating, tenderness, juiciness and amount of mouth coatin
increased as fat level in the cooked patties increased. NGKR

2544 Strange (ED). Quantitation and characterization of drip from frozen
thawed and refrigerated pork liver. Journal of Food Science 52(4)
1987; 910-915

Drip from fresh, refrigerated and frozen and thawed vacuum pack
aged pork liver slices were characterised by blood or plasma content
enzymatic activity, protein content, etc. and the appearance of store
liver could be improved by removal of blood immediately postmortem a
this treatment which may or may not decrease wt. loss would give th
liver better appearance and thereby increase the value of the produc
in the export market. NGKR

2545 Vaughn (MW), Wallace (DP) and Forster (BW). Yield and comparison o
nutritive and energy values: Selected variety pork products. **Journa**
of Food Science 52(4); 1987; 906-909

Raw and cooked pork products were compared for yield, physiolo
gic energy values, nutritive value and protein quality. The result

showed that cooking resulted in some significant changes in parameters. The fat composition showed a very low ratio of polyunsaturated to total saturated fats. The data indicated that the chemical score and the calculated PER values of these products were in general directly proportional to the total quantity of essential amino acids present. NGKR

Swine

2546 Bache (CA), Gutenmann (WH), Kirtland (D) and Lisk (DJ). Cadmium in tissues of swine fed barley grown on municipal sludge-amended soil. **Journal of Food Safety** 8(3); 1987; 199-204

The extent of cadmium uptake by plants grown on soil applied with municipal sludge several yr earlier and its magnitude of deposition in animal tissues when the crop was fed has been studied and results presented in this paper. In these studies barley was grown on soil applied 5 yr earlier with municipal sewage sludge from New York. The harvested grain was fed to growing male swine for 73 days and after slaughtering the animals, their tissues were analysed for cadmium by conventional stripping voltametric analysis. The results showed that the cadmium concn. in kidney and liver were greater in the sludge treatment group than in the controls. Average daily feed intake and wt. gain was greater for the animals in the sludge treatment group but the feed/grain ratio was not different between the two treatment groups. NGKR

Porcine

2547 Tyczkowska (K), Hutchins (JE) and Hagler (WMJr). Liquid chromatographic determination of aflatoxicol in porcine liver. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 475-478

Meat products

2548 Newsome (RL), Seman (DL), Langlois (BE), Moody (WG), Fox (JD) and Gay (N). Microbiological quality of restructured and conventional steaks manufactured from electrically stimulated hot- and cold- boned carcasses. **Journal of Food Science** 52(4); 1987; 861-864, 868

The microbiological quality of restructured beef steaks was compared with that of conventional loin steaks. The results of this study suggested that vacuum packaging is the method of choice for enhancing the shelf life of restructured steaks and is commercially advantageous for hot boned meat products. NGKR

2549 Rittenburg (JH), Adams (A), Palmer (J) and Allen (JC). Improved enzyme-linked immunosorbent assay for determination of soy protein in meat products. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 582-587

An indirect, competitive enzyme-linked immunosorbent assay (ELISA) has been developed for quantitation of soy protein in meat products. The methodology allows rapid aqueous extraction of meat samples into a liquid form suitable for assay. The assay is highly specific for soy protein and is designed to measure soy protein levels between 1 and 10% of the wet wt. of the sample. Standardized, stabilized reagents for carrying out the procedure are commercially available in a kit. The analysis, including sample preparation, can be completed within a workday, and the actual immunoassay < 60 min. AS

Frankfurters

2550 Lee (CM), Whiting (RC) and Jenkins (RK). Texture and sensory evalu tions of frankfurters made with different formulations and processe **Journal of Food Science** 52(4); 1987; 896-900

The objective tests for evaluating the textural properties frankfurters were investigated by varying formulations and processi conditions and then correlated the nine textural qualities with elev instrumental methods. High correlations were found between shear for and sensory elasticity; firmness and chewiness; stress relaxation a elasticity; total fluid and juiciness; and moisture and waterines etc. NGKR

Ham

2551 Dalla Rosa (M), Manzano (M) and Cherubin (S). Gas chromatograph monitoring of induced fungal growth in cured ham. **Industrie Alimenta** 26(6); 1987; 545-549 (It).

Fungal growth of inoculated samples of cured ham during stora at different temp. was monitored by means of the ethanol developi into the samples headspace vapour. Showing the growth of the inocu ated mould (**Penicillium expansum**) the most detectable alteration, t limit of acceptability of the samples of cured ham was evaluat choosing an arbitary threshold of the ethanol developed. AS

Sausages

2552 Ziegler (GR), Rizvi (SSH) and Acton (JC). Relationship of water co tent to textural characteristics, water activity, and therma conductivity of some commercial sausages. **Journal of Food Scien** 52(4); 1987; 901-905

In this study a linear relationship was found between moistur content and the moisture to protein ratio for the sausages. The wate activity of dry and semi-dry sausages can be estimated with reasonabl confidence from a knowledge of the products final salts and water con tents. Moisture was found to have no significant effect c cohesiveness. The relationship between moisture content and a particu lar texture parameter was non-linear. Within limits a desired textur might be achieved by drying the sausage to a predetermined moisture NGKR

Poultry

2553 Knabel (SJ), Walker (HW) and Kraft (AA). Enumeration of fluorescen pseudomonads on poultry by using the hydrophobic-grid membrane filte method. **Journal of Food Science** 52(4); 1987; 837-841

Flourescent pseudomonads were found to be the major organism responsible for the spoilage of fresh poultry since they possesse inducible enzymes for the production of fluorescent siderophores an the degradation of sulphur-containing amino acids. It is possible fro these studies that the proposed HGMF method will not only eliminat sources of flourescent pseudomonads but also by actual enumeration i poultry permit accurate shelf life prediction. NGKR

Chickens

2554 Smith (DM), Salih (AM) and Morgan (RG). Heat treatment effects o warmed-over flavour in chicken breast meat. **Journal of Food Scienc**

52(4); 1987; 842-845

This study on the effects of heat treatment on the development of warmed-over flavour (WOF) in fresh chicken breast meat showed that the various processing effects on or in precooked chicken products, the WOF can be minimised or predicted. Precooking below a threshold temp. of 74 C can significantly control WOF in stored precooked chicken. NGKR

Broilers

2555 Choudhary (MK) and Aggarwal (GK). Effect of early protein restriction on body measurements and meat quality of broilers. **Indian Veterinary Journal** 64(5); 1987; 408-414

Three batches of 300 chicks were used to study the effect of early protein restriction on body measurements and meat quality. Each batch was randomly divided into 6 treatments. Severe protein restriction i.e. 13% compared to 18 or 23% during first 4 to 6 weeks of life of birds resulted in retarded growth of shanks, keel and breast. Minor changes in protein concn. of ratios (18 to 23% in this experiment) did not have appreciable effect on the size of these body measurements. Appreciable signs of compensatory growth were not observed for the size of keel and shanks of birds but some amount of compensatory growth for the breast angle was noted. Shrinkage percentage due to pre-slaughter fasting decreased with advancement of age. The percent shrinkage was inversely proportional to protein level, in the starter diet. Dressing, ready-to-cook and percent loss in wt. due to chilling were not affected by early protein restriction. The birds fed higher dietary protein percentage had higher warm eviscerated percentage at all ages. AS

Quails

2556 Singh (RP) and Panda (B). Physico-chemical characteristics of quail-broiler and spent quail meat. **Journal of Food Science and Technology, India** 24(4); 1987; 196-197

Quality characteristics of dark and light meat from Coturnix quail aged 5 wk (quail broiler) and 58 wk (spent layer quail) were evaluated. Irrespective of age, dark meat had higher moisture, ether extract, collagen contents, water holding capacity, pH and shear force values than light meat while crude protein, sarcoplasmic and myofibrillar proteins were lower. Increase in age of the bird was associated by a decrease in moisture, and organoleptic quality and an increase in crude protein, ether extract, collagen and shear force values in dark and white meats, but increase in myofibrillar proteins was found only in light meat. Cooking loss was 28.79% in quail broiler and 30.56% in spent layer carcass. KAR

Turkeys

2557 Cremer (ML) and Richman (DK). Sensory quality of turkey breasts and energy consumption for roasting in a convection oven and reheating in infrared, microwave, and convection ovens. **Journal of Food Science** 52(4); 1987; 846-850

Studies on the detn. of the sensory quality of turkey breasts and energy consumption in roasting at 163 C and 105 C and reheating in microwave, infrared and convection ovens showed that freshly roasted turkey scored significantly higher for overall quality lack of stale flavour, appearance and lack of browning than other samples.

NGKR

Poultry products

Eggs

2558 Mahapatra (CM), Pandey (NK), Verma (SS) and Harpreet Singh. A comparison of physical quality, composition, cholesterol, vitamin A and fatty acid contents of Guinea fowl and chicken eggs. **Journal of Food Science and Technology, India 24(4); 1987; 168-171**

Various parameters tested for Guinea fowl egg and chicken egg were: egg wt. 38.04 and 51.25 g, albumen index 0.084 and 0.094, yolk index 0.382 and 0.438, Haugh unit 78.91 and 68.88, yolk colour score 10.58 and 7.83, shell thickness 0.45 and 0.33 mm, sp. gr. 1.084 and 1.097, albumen wt. 18.32 and 29.86 g, yolk wt. 12.08 and 14.87 g, % albumen wt. 48.20 and 58.29 and % yolk wt. 31.85 and 29.07. Total lipid content was 352.0 and 417.7 mg, cholesterol content was 3.5 and 4.0 mg and vitamin A content was 16.4 and 22.4 IU resp. No difference was observed in proximate composition of egg contents and fatty acid contents of yolk lipids in the eggs from these two sources. Significant differences were not found in various sensory characteristics between different products preferred from the eggs of the two sp. KAR

SEAFOODS

2559 Mathew (CKM). Marine products exports - problems and prospects. **Indian Food Industry** 6(2); 1987; 53-57

Crabs

2560 Narayanan (KR), Pragatheeswaran (V), Ajmalkhan (S) and Natarajan (R). Cadmium induced black pigmentation in Scylla **serrata** (forskal) **Seafood Export Journal** 19(7); 1987; 23-26

Healthy specimens of Scylla **serrata**, an estuarine portunid crab, were exposed to Cd concn. of 1, 2, and 3 p.p.m. for 30 days. The LC 50 value after 96 h was 8 p.p.m. Black pigmentations were observed on the ventral sternum and gills of the specimen exposed to all the three Cd concn. Such indications could be useful in quality control work. KMD

Fish

2561 Annamalai (V), Kandoran (MK), Thankamma (R) and Balachandran (KK). Economics of production of fish pickles and fish wafers. **Seafood Export Journal** 19(7); 1987; 17-22

The production cost of fish pickles, calculated on the basis of data collected over a whole yr, works out to Rs. 10.20/bottle of 360 g, while the cost of 1 kg of fish wafers works out to Rs. 35.85/kg. The ingredients for the fish pickled and fish wafers and also the method of preparation and the capital and recurring expenses have been described. KMD

2562 Chattopadhyay (P), Roy (AK) and Lala (S). Studies on transportation of wet fish. IV. Use of liquid nitrogen as a secondary refrigerant. **Journal of Food Science and Technology, India** 24(4); 1987; 178-180

A laboratory model insulated unit was fabricated from Al. sheet

(2 mm) with 4 in. polyurethane foam slab insulation. Temp. of 4 C from an initial temp. of 33 C was maintained by allowing liquid N (LN) to evaporate from an insulated container. The drop in the inside temp. is rapid during the first one h of cooling operation, (24 C for LN and 14 C for ice) and LN requires less heat transfer surface (0.07 sq. m.) than solid ice of 0.96 sq.m. for same refrigeration effect. As the fish temp. cannot be brought down so quickly with cold N gas due to the poor heat transfer between stagnant N gas and fish a combination of ice and LN was found to bring down the temp. to 4 C within 1 h which would have droped to 9 C only with ice alone. It is concluded that ice melting rate can be reduced by about 50% with an polyurethane foam insulation and this can be further reduced to a negligible amount (0.05 kg/h) if a LN is used to maintain the temp. around 4 C. [For Part III See Journal of Food Science and Technology, India 15, 1976, 226]. KAR

2563 Gouygou (JP), Sinquin (C) and Durand (P). High pressure liquid chromatography determination of histamine in fish. **Journal of Food Science** 52(4); 1987; 925-927

Histamine detn. in fish has been carried out by HPLC method which is a sensitive, simple and selective and does not require any specific extraction procedure. In this method analysis can be performed rapidly in an automated system after simple sample preparation and derivatization with a o-phthalaldehyde. Recovery values are also good. NGKR

2564 Subrata Basu, Das (KP), Chattoraj (DK) and Gopakumar (K). Measurement of denaturation of fish, goat and beef proteins - a viscometric study with protein stabilized emulsions. **Journal of Food Science and Technology, India** 24(4); 1987; 172-177

Thermal transition of fish, goat and beef proteins have been determined from the protein stabilised food emulsions using a rotating viscometer. The emulsions have been characterised by a non-Newtonian index (Shearing, thinning or thickening index). Shear thinning index values are reported for fish, beef and goat emulsion at different pH values and at varying temp. The thermal transition temp. for salt-extracted fish protein as determined by Ostwald-viscometer was 35 C and the specific viscosity decreased steadily until around 35 C. Transition temp. for goat meat emulsion was 42.0 C whereas for beef meat emulsion it was 34 and 36.5 at pH 5.43 and 7.00 resp. The data have been utilized to calculate quantitatively the fraction of protein denatured at any temp. The emulsion method is found to give same results as that of Ostwald's method and the advantages of emulsion method over the existing methods have been indicated. KAR

Anchovies

2565 Filsinger (BE). Effect of pressure on the salting and ripening process of anchovies (Engraulis anchoita). **Journal of Food Science** 52(4); 1987; 919-921

In this study the effect of pressure on the salting and ripening process of anchovies is carried out and results showed that highest pressure lowered the ripening velocity, but accelerated the salt penetration which decreased water activity and inhibited bacterial growth more rapidly, but this product did not possess the best sensory characteristics. Very little pressure changed the maturation and yielded an over ripe product. NGKR

2566 Harmon (SM), Kautter (DA) and Mckee (C). Spoilage of anchovy-stuffe olives by heterofermentative Lactobacilli. Journal of Food Safet 8(3); 1987; 205-210

The processing and spoilage problems associated with swolle cans of imported green olives stuffed with anchovies has been studie and results presented in this paper. Headspace gas from swollen can was analysed using procedures and equipment described in the bacteriological analytical manual. The results showed that the spoilage wa characteristic of protein swells occurring with canned fish marinade but not with other acidified canned foods. This spoilage results ir gradual decrease in acidity of the olive brine from about pH 4.3 tc 5.25 and swelling of the cans due to carbon dioxide due to decomposition of the anchovies by proteolytic enzymes action with subsequent decarboxylation and deamination of amino acids from the anchovies by heterofermentative lactobacilli. NGKR

Cod

2567 Botta (JR), Bonnell (G) and Squires (BE). Effect of method of catching and time of season on sensory quality of fresh raw Atlantic cod (**Gadus morhua**) **Journal of Food Science** 52(4); 1987; 928-931, 938

Sensory analyses was conducted to assess effect of method of catching and time of season upon blood cot, colour, discolouration/bruising, odour, texture and final overall grades of fresh raw cod muscle, muscle pH and firmness of cooked muscle. Results showed that method of catching significantly affected only colour, discolouration/bruising and final overall grades. Time of season did not significantly affect any sensory variables. In general, method of catching was the most important factor affecting sensory quality of raw cod. NGKR

2568 Botta (JR), Kennedy (K) and Squires (BE). Effect of method of catching and time of season on the composition of Atlantic cod (**Gadus morhua**). **Journal of Food Science** 52(4); 1987; 922-924

The present study was designed to determine the effect of both method of catching and time of season upon the composition of Atlantic cod fillets. The results showed that the effect of method of catching upon the moisture and hence, protein and caloric contents of the fillets was greatly influenced by the extent of struggling experienced by the cod prior to being brought on board the vessel. NGKR

Flying fish

2569 Taguchi (T), Ishizaka (H), Tanaka (M), Nagashima (Y) and Amano (K). Protein-protein interaction of fish myosin fragments. **Journal of Food Science** 52(4); 1987; 1103-1104

Protein-protein interaction of myosin fragments from flying fish and white marlin muscles was studied by means of absorbance changes resulting from aggregation at temp. of 20 - 70 C. The degree of promotion was high for flying fish and low for white marlin. NGKR

Hake

2570 Perez-Villarreal (B) and Howgate (P). Composition of European hake, **Merluccius merluccius. Journal of the Science of Food and Agriculture** 40(4); 1987; 347-356

The chemical composition of eleven batches of European hake,

Merluccius merluccius caught in waters off Scotland was analysed for moisture, total N, ash, lipid and non-protein N according to standard methods which were found to be 79.04%, 2.96%, 1.31%, 2.24%, 0.304% resp. Only small differences in composition were found and the length/wt. relationship, condition factor and the yields of various parts of fish were also determined and reported in this paper. NGKR

Trouts

2571 Teskeredzic (Z) and Pfeifer (K). Determining the degree of freshness of rainbow trout (**Salmo gairdneri**) cultured in brackish water. **Journal of Food Science** 52(4); 1987; 1101-1102

This study was undertaken to compare the sensory characteristics and quantities of trimethyl amine (TMA) in the rainbow trout reared in brackish water contained with trout reared throughout their lives in clean and fresh water. The results suggested an upper acceptable limit of TMA in trout for human consumption is around 10 mg%. NGKR

Molluscs

Squids

2572 Kolodziejska (I), Sikorski (ZE) and Sadowska (M). Texture of cooked mantle of squid **Illex argentinus** as influenced by specimen characteristics and treatments. **Journal of Food Science** 52(4); 1987; 932-935

Squid, an under utilised marine food resource changes in protein solubility and softening of the meat continued for atleast 45 min by boiling frozen stored squid in 2% NaCl solution causing 30% wt. loss after 5 min. Pretreatment in 2% polyphosphate solution made the cooked product less tough and more juicy. The increase in P in the muscle tissue due to soaking in the polyphosphate solution was very slight. Large influence was exerted by the pH of the raw tissue. NGKR

2573 Yamanaka (H), Shiomi (K) and Kikuchi (T). Agmatine as a potential index for freshness of common squid (**Todarodes pacificus**) **Journal of Food Science** 52(4); 1987; 936-942

In this study the concn. of various amines (tyramine, putrescine, cadaverine, agmatine and tryptamine) were investigated in relation to decomposition processes of common squid. It was found that Agmatine was found to be most useful as a potential index for freshness of common squid. Agmatine detected in the initial stages in the fresh muscle increased from 36 to 40 mg/100 g at the stage of advanced decomposition. Similarly putrescine detected in initial stage increased at the advanced stage of decomposition. Thiamine might be involved in the putrid smell. NGKR

Oysters

2574 Hackney (CR), Biede (SL), Arbour (P), Reily (L), Kilgen (M) and Cole (M). Variation in the levels of sodium and other minerals of nutritional importance in Louisina oysters (**Crassostrea virginica**). **Journal of Food Science** 52(4); 1987; 1099-1100

In this study variations in the mineral content of oysters were often to be directly influenced by the growing water. This variation must be taken into consideration should sodium labelling be required for fresh oysters. NGKR

2575 Kaysner (CA) and Weagant (SD). Limitations of the A-1M method for fecal coliform enumeration in the pacific oyster (**Crassostrea gigas**). **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 535-537

Use of the A-1M method, which was originally devised for testing water samples, has recently been extended for enumeration of fecal coliforms and **Escherichia coli** in shellfish and other food products. Results of our study indicate that while this method is reliable for analysis for growing waters, the use of the A-1M method for testing Pacific oysters may be less reliable because bacteria not belonging to the coliform group but which are sometimes present in these animals also give a positive reaction. AS

Shrimps

2576 Thomas (F) and Mathen (C). Freezing time and thawing losses of block frozen shrimp meat. **Seafood Export Journal** 19(7); 1987; 5-6

Thawing losses in shrimp (**Metapenaeus dobsoni**) meat frozen for 90 and 180 min, were nearly the same, viz., 13.7 and 13.4% resp. KMD

PROTEIN FOODS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Beer

2577 Irwin (AJ) and Thompson (DJ). A rapid method for the extraction and analysis of beer flavour components. **Journal of the Institute of Brewing** 93(2); 1987; 113-115

Dispersal of beer on a commercially available tube of Kieselguhr and elution with dichloromethane was found to be a much faster and more efficient method of obtaining a beer flavour extract than liquid-liquid extraction. The constitution of each type of extract was qualitatively similar. The use of an internal standard allowed major flavour components to be quantitatively analysed. AS

2578 Nelson (G) and Young (TW). The addition of proteases to the fermenter to control chill-haze formation. **Journal of the Institute of Brewing** 93(2); 1987; 116-120

The addition of papain and proteases isolated from various yeast strains to fermentation to reduce chill-haze formation is discussed. Particular attention is paid to the behaviour of the yeast throughout fermentation and to the character of the final beers. The results suggest that fermentation in the presence of papain and a protease preparation prepared from **Candida olea** 148 progress normally and in the case of **C. olea** 148 protease-treated fermentation no change in beer flavour was detected. AS

Malt

2579 Delcour (JA) and Verschaeve (SG). Malt diastatic activity. Part I. The EBC determination of diastatic power: The under estimation of the release of reducing sugars by iodometric titration and the chromogen p-hydroxybenzoic acid hydrazide as alternative method. **Journal of the Institute of Brewing** 93(2); 1987; 121-124

It is shown that the reducing groups formed during the amylolysis of soluble starch in the detn. of malt diastatic power are under estimated in the titration with iodine. This is due to problems associated with the over oxidation of iodine in the presence of excess alkali rather than to the binding of substantial quantities of iodine to starch. It is proposed to apply a calorimetric estimation of reducing groups with the chromogen p-hydroxybenzoic acid hydrazide. Detn. of diastatic powder by this method results in lower standard deviations of individual estimations and on the average to 7.6% higher reading of diastatic power. AS.

2580 McCleary (BV) and Shameer (I). Assay of malt Beta-glucanase using azo-barley glucan: An improved precipitant. **Journal of the Institute of Brewing** 93(2); 1987; 87-90

A procedure recently described for the assay of malt Beta-glucanase, which employs a dye-labelled and chemically-modified barley Beta-glucan substrate, has been improved by changing the precipitant solution used to terminate the reaction. The new precipitant solution contains 0.4% (w/v) zinc acetate and 4% (w/v) sodium acetate dissolved in 80% (v/v) aqueous methyl cellosolve. With this precipitant the procedure can be directly applied to the assay of cellulase activity, and with minor modification, to the assay of lichenase activity. AS

Wort

2581 Moonen (JHE) and Graveland (A). The molecular structure of gel protein from barley, its behaviour in wort-filtration and analysis. **Journal of the Institute of Brewing** 93(2); 1987; 125-130

Wines

2582 Lau (BP-Y) and Weber (D). Determination of diethylene glycol in wines by high-resolution gas chromatography mass spectrometry. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 412-417

In this paper a simple and rapid non extractive clean up procedure for quantitative detn. of diethylene glycol (DEG) in wines by capillary GC/MS is discussed. This method uses decolorization by charcoal followed by dilution with acetonitrile and filtration. The recovery was calculated to be about 90% by HR GC/MS and selected ion monitoring a min. detection limit of 1.0 mg/L (ppm) can be estimated easily. The methodology adopted was repetitive scanning EI (electron impact) and isobutane CI (Chemical Ionisation) methods to conform the identify of DEG in wines at 1 mg/L or above using the internal standard method the extensive spiking studies further proved that the method is reliable and precise. NGKR

Non-alcoholic beverages

Coffee

2583 Abraham (KO) and Shankaranarayana (ML). Volatile flavour compounds i coffee. **Indian Coffee** 51(6/7); 1987; 8-19

This brief review lists about 600 compounds that contribute t coffee flavour. They include: 30 aliphatic hydrocarbons; 21 aromati hydrocarbons; 24 alcohols and ketoalcohols; 24 aldehydes; 45 ketones 35 acids; 14 acid anhydrides or lactones; 32 ethers and esters; 5 compounds; 11 S compounds; 22 alicyclic compounds, 6 quinones or poly phenols; 9 amines; 3 indoles; 2 quinolines; 101 hydrocyclic compound or furans; 37 pyrroles; 29 oxazoles; 27 thiophenes; 28 thiazoles; 1 phenols; 9 pyridines; and 81 pyrazines. Two tables indicate, resp. the chemical composition of green and roasted coffee, and the formation of aroma volatiles in coffee. KMD

2584 Anon. Special features of Atlas conrad freeze-drying system. **Tea and Coffee Trade Journal** 159(2); 1987; 10-12

Briefly discusses the freeze-drying of coffee and its advantages. BV

2585 Baltes (W) and Bochmann (G). Model reactions on roast aroma formation. I. Reaction of serine and threonine with sucrose under the conditions of coffee roasting and identifcation of new coffee aroma compounds. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 340-346

The volatiles from roasting mixtures of sucrose, serine and threonine were analysed by capillary GC/MS. About 350 compounds were isolated and these represent about 59-91% of the quantities of all volatiles isolated after roasting the mixtures under the conditions of coffee roasting. Nitrogen detector was useful to characterise N-containing compounds in the gas chromatogram in addition to modified calculation of kovats indices, their mass speectra and their quantities. Structures were confirmed by spectra from the literature and by comparison with the reference standards. With the exception of furans and oxazoles most of them were also formed after heating serine and threonine in the absence of sucrose. In addition to Maillard reaction pyrolytic reactions have occurred and out of 160 compounds identified 53 compounds are found to be new compounds not so far identified. NGKR

2586 Lewis (J). On-line instrument measures moisture, density, temperature. **Tea and Coffee Trade Journal** 159(2); 1987; 16-17

An on-line process measurement and control instrument which measures moisture, temp. and density applied to coffee processing applications is discussed. BV

2587 Silwar (R), Kamperschroer (H) and Tressl (R). Behaviour of some sulphur-substituted furan derivatives during staling of roasted Arabica and Robusta coffee. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(5-6); 1987; 140-144

2588 Silwar (R), Kamperschroer (H) and Tressl (R). Gas chromatographic-mass spectrometric investigation of coffee aroma-quantitative determination of steam-volatile aroma constituents. **Chemie Mikrobiologie Technologie der Lebensmittel** 10(5-6); 1987; 176-187 (De).

Caffeine

2589 Anon. Evaluation of caffeine safety. **Food Technology 41(6); 1987; 105-111, 113**

Discusses caffeine content of beverages, foods, and drugs; physiological effects; toxicity; questions of safety - ulcers and heart burn; cardiovascular disease, cancer, fibrocystic breast disease, effects on birth, development, and growth and effect on central nervous system; alternative to caffeine-containing beverages; coffee decaffeination - water extraction and direct solvent extraction; tea decaffeination and safety of methylene chloride decaffeinated coffee. BV

Cola

2590 Stavric (B) and Klassen (R). Caffeine content in colas from New York state and Ontario. **Journal of Food Safety 8(3); 1987; 179-185**

The major brands of cola drinks obtained from New York and Ontario states in 1986 were analysed for caffeine by HPLC method. The mean values reported are 92.5 ug/mL for New York and 86.5 ug/mL for Ontario whereas the mean caffeine values for the regular colas were 34.3 and 21.5 mg/can for these two states resp. The range of caffeine for all the products was found to be 0.8-50.8 mg/can for New York state and 0.03-29.4 mg/can for Ontario products whereas the earlier reports in 1979 the average was 47.3 mg/can and in 1976 the average was 40 mg/can indicating a general decrease in caffeine content in cola beverages in the last 7 yr. NGKR

Fruit juices

2591 Lau (O-W) and Luk (S-F). Spectrophotometric determination of ascorbic acid in canned fruit juices, cordials, and soft drinks with iron (III) and 1,10-phenanthroline as reagents. **Journal of the Association of Official Analytical Chemists 70(3); 1987; 518-520**

The method is based on the reduction of iron (III) by ascorbic acid to iron (II) which is then complexed with 1, 10-phenanthroline. A wide range of samples including mango and lemon tea drinks and also grapefruit juices for which same background correction was needed which was achieved by copper (II) - catalysed oxidation of the acid. MVG

Apple juices

2592 Toribio (JL) and Lozano (JE). Formation of 5-hydroxymethylfurfural in clarified apple juice during heating at elevated temperatures. **Lebensmittel-Wissenschaft und-Technologie 20(2); 1987; 59-63**

The rate of formation of 5-hydroxymethylfurfural (HMF) was investigated in Red Delicious (RD) and Granny Smith (GS) apple juice during heating at elevated temp. HMF was determined in juices that contained soluble solids ranging from 15 to 70° Brix and at temp. of 100, 104 and 108 C. The results indicate an apparent zero-order reaction rate, with an induction period that depends on temp., soluble solids and apple var. The HMF build-up reaction proceeded up to four times faster in GS juice and followed an Arrhenius-type dependence with temp. Activation energy ranged from 33.8 to 46.8 kcal/mol. The induction period was in the range 9-31 min. The induction period became shorter as soluble solids or temp., increased. AS

Citrus juices

2593 Beeman (CP). Improved efficiency for colorimetric determination o furfural in citrus juices. Journal of the Association of Official Analytical Chemists 70(3); 1987; 601-602

The operational efficiency of a method for colorimetric detn. o furfural in citrus juices is improved by inclusion of a concn. screening step prior to the colour reaction. The absorbance at 277 n may be used to determine the appropriate dilution for samples exceeding the recommended max. furfural concn. in the reaction mixture. A much as 1 h per sample may be saved in the time required for analysis AS

Grape jiuces

2594 Amba Dan), Adsule (PG) and Negi (SS). Evaluation of new grape cultivars for processing. Journal of Food Science and Technology, Indi 24(4); 1987; 194-196

Two new grape cv. Arkavati and Arka Shyam released recently from the Indian Institute of Horticultural Research, Bangalore (India) were evaluated for raisin production and juice extraction. The white seedless Arkavati was found good for raisin production, the raisin obtained was better than those obtained from Thompson Seedless. Arka Shyam was found better for juice extraction and the juice was better than those obtained from 'Concord' grape. The juice yield of Arka Shyam was 67.20% and contained 24.0% soluble solids and 3.75% total sugars. KAR

Orange juices

2595 Wilson (CWIII) and Shaw (PE). High-performance liquid chromatographic determination of ascorbic acid in aseptically packaged orange juice using ultraviolet and electrochemical detectors. Journal of Agricultural and Food Chemistry 35(3); 1987; 329-331

The ascorbic acid was estimated by three different methods in asceptically packaged orange juice obtained from commercial sources. Values using UV and EC detectors were comparable to values obtained by potentiometric titration method. The EC detector was found to be 100 times more sensitive than UV detector. During storage ascorbic acid was found to decrease in the samples under normal marketing conditions. NGKR

Tea

2596 Williams (DM). Tea handling without degradation. Tea and Coffee Trade Journal 159(2); 1987; 32, 34-35

FATS AND OILS

Fats

2597 Koritala (S), Hesseltine (CW), Pryde (EH) and Mounts (TL). Biochemical modification of fats by microorganisms: A preliminary survey. Journal of the American Oil Chemists" Society 64(4); 1987; 509-513

Over 100 different strains of bacteria, actinomycetes, fungi and yeasts were incubated at 28 C for five days in the presence of soybean oil. Some soybean oil was consumed by many microorganisms, and some was also hydrolyzed to free fatty acids. **Aspergillus oryzae**, two different strains of **Amylomyces rouxii** and **Rhizopus oligosporus** hydrolyzed the oil completely (95%). The fatty acids from **Aspergillus flavus** fermentation contained less linolenic acid than the original soybean oil. Lipase was found intra- and extracellularly when microorganisms were grown in the presence of soybean oil. AS

Oils

2598 Coxon (DT), Rigby (NM), Chan (HW-S), Lund (BM) and George (SM). The occurrence of hydrogen peroxide in edible oils; chemical and microbiological consequences. **Journal of the Science of Food and Agriculture** 40(4); 1987; 367-379

The widespread occurrence of hydrogen peroxide in many types of edible oil at concn. beyond the permitted levels in asceptic packages has been reported. It has also been demonstrated that soybean oil enhances the lethal effect of heat on spores of **Clostridium sporogenes** due to presence of hydrogen peroxide and the occurrence of hydrogen peroxide at low levels in edible oils of both animal and vegetable origin is reported to the tune of 0.1-11.5 µg/ g-1 of oil. Detection of this in various oils was based on measurements by HPLC; luminescence, colorimetry and fluorimetry. The results indicate that hydrogen peroxide concn. in oil has no relation to its peroxide value and it is suggested that this arises as a byproduct of the lipid autooxidation process and hence hydrogen peroxide did not appear to function as a source of hydroxyl radicals capable of initiating autooxidation reactions. It has also been seen that by washing with water the lethal effect of soybean oil is considerably reduced due to the removal of hydrogen peroxide. NGKR

Coconut oils

2599 Gopalakrishnan (N), Narayanan (CS), Mathew (AG) and Arumughan (C). Lipid composition of coconut cake oil. **Journal of the American Oil Chemists" Society** 64(4); 1987; 539-541

Lipid classes and fatty acids were analyzed in expeller and rotary extracted coconut oils and corresponding solvent extracted cake oils. Triacylglycerols (84.0 to 93.1%); 1,2 diacylglycerols (1.5 to 5.1%); 1,3 diacylglycerols (1.2 to 2.1%); monoacylglycerols (1.0 to 7.0%); free fatty acids (1.0 to 2.6%); phospholipids (0.03 to 0.4%) and glycolipids (0.2 to 0.35%) were present in these oils. Fatty acid composition of triacylglycerols, phospholipids and glycolipids resembled each other and differed from those of 1,2 and 1,3 diacylglycerols which in turn were similar. AS

Essential oils

2600 Lawrence (BM) and Reynolds (RJ). Progress in essential oils. **Perfumer & Flavorist** 12(4); 1987; 69-73, 76, 80

Covers clove oil, coriander oil, laurel leaf oil, mandarin oil, marjoram oil and **Ocimum gratissimum** oil. BV

Groundnut oils

2601 Singleton (JA) and Pattee (HE). Characterization of peanut oil triacylglycerols by HPLC, GLC and EIMS. **Journal of the American Oil Chemists" Society** 64(4); 1987; 534-538

Twenty-three peanut oil triacylglycerols have been characterize by liquid-chromatography, gas chromatogrphy and electron impact mas spectrometry. High resolution was achieved using two 8 cm x 6.2 m reverse phase columns in series, and 20 of the triacylglycerols wer separated in an analysis time of less than 45 min. Triacylglycerol were identified by analyzing each liquid chromatography fraction for carbon number, fatty acid composition and mass fragmentation pattern The combined application of these methods permitted the identificatio of triacylglycerols representing combinations of all of the fatty acids present in peanut oil. AS

Rapeseed oils

2602 Lange (R) and Linow (F). Sulphur and sulphur compounds in rape oils. **Lebensmittelindustrie** 34(3); 1987; 113-114 (De).

Rice bran oils

2603 Kim (CJ), Byun (SM), Cheigh (HS) and Kwon (TW). Comparison of solvent extraction characteristics of rice bran pretreated by hot air drying, steam cooking and extrusion. **Journal of the American Oil Chemists" Society** 64(4); 1987; 514-516

Rice bran was pretreated by hot air drying, steam cooking and extrusion before solvent extraction of oil. The extractions were conducted in a glass column percolator (i.e. 120 mm), packed to a depth of 90 cm and using n-hexane at 60 C and gravity feed. Fines (defined as < 0.5 mm) in raw bran were significantly reduced by steam cooking and extrusion treatments. Extruded rice bran (ERB) was pelletized and had a bulk density 1.5 times higher than the other products. Regardless of the wt. of bran loaded in the percolator, extraction time to reach 1% residual oil was decreased in the order of 116, 67 and 10 min. for hot air-dried rice bran (HARB), steam-cooked rice bran (SRB) and ERB, resp. This was due to increases in the percolation rate of SRB by 2 times and by 9 times for ERB compared to HARB. The sovlent/bran ratio for extraction to 1% residual oil was decreased by nearly half, from 3.18 for HARB and 3.12 for SRB to 1.77 for ERB. AS

Soybean oils

2604 Moulton (KJSr), Moritala (S), Warner (K) and Frankel (EN). Continuous ultrasonic hydrogenation of soybean oil. II. Operating conditions and oil quality. **Journal of the American Oil Chemists" Society** 64(4); 1987; 542-547

SPICES AND CONDIMENTS

Spices

2605 Williams (SK) and Brown (WL). Future trends for flavourings and spices. **Food Technology** 41(6); 1987; 76, 78-79, 124

Aspects covered include antioxidant effects of natural flavourings; preservative effects of natural spices; flavour enhancers; fermentation aids; flexible foods and future flavour research. BV

Fennel

2606 Misra (N) and Batra (S). Mycotoxins in fennel seed. **Journal of Food Safety** 8(3); 1987; 157-160

The aflatoxins viz. **Aspergillus flavus, A. ochraceous and Fusarium secretea** on the fennel seeds have been qualitatively and quantitatively analysed as fennel is widely used as spice. The aflatoxins were assayed in fresh fennel seeds from ten different fields immediately after harvesting by standard method for the presence of aflatoxins B1, B2, G1 and G2. Five samples were found to contain aflatoxins B1, B2 and G1 during a 12 month storage period. One nonfluorescent sample contained detectable aflatoxin B1 after 12 months of stroage. NGKR

SENSORY EVALUATION

2607 Buuren (SV). Using multiple correspondence analysis in sensory quality research. **Chemistry and Industry** (13); 1987; 447-450

This paper discusses multiple correspondence analysis (MCA) in the field of sensory quality research. Measurement levels and principal components, correspondence analysis, application of MCA in sensory quality research (free choice profiling, data set, analysing the data with MCA and procruses analysis) and advantages of MCA are briefly considered. BV

2608 Gunderson (RW). Use of false-colour data imaging for comparison of organoleptic and chemical classifications. **Chemistry and Industry** (13); 1987; 450-454

Illustrates the use of colour data imaging, by using it to compare the results obtained by two different forms of product classification; organoleptic, or sensory, testing and chemical data analysis. BV

2609 Heath (MR) and Lucas (PW). Mastication: The need for collaborative research. **Journal of Texture Studies** 18(2); 1987; 111-123

Covers a more complete understanding of the physical treatment of food in the mouth of a patient and consumer; psychophysics and physiology; characterization of foods; suggested areas for collaboration. NGKR

2610 Laamanen (M) and Jounela-Eriksson (P). The use of descriptive analysis in the quality control of sweet gale extracts. **Lebensmittel-Wissenschaft und-Technologie** 20(2); 1987; 86-90

A descriptive method to evaluate the flavour of sweet gale extracts has been developed. The method was used for the quality control of a commercial extract and macerates which were extracted in different ethanol concn. Typical flavour characteristics of sweet gale extracts were: lingonberry-like, conifer-like, raisin-like, spicy, sweet and bitter. Low ethanol concn. in the extraction process did not have any significant effect on the sensory characteristics of an extract. High ethanol concn. strengthened the papery aroma and bitter taste in an extract. A selected and trained sensory panel was found to be a useful tool in the assignment task. AS

2611 Shepherd (R), Farleigh (CA) and Wharf (SG). The effects of caffeine on salt taste sensitivity. **Lebensmittel-Wissenschaft und-Technologie** 20(2); 1987; 95-97

Twenty-nine subjects rated the intensity of sodium chloride

(NaCl) solutions following a pre-rinse with either 0.1 mM caffeine or with water. No differences were found in perceived intensity for the two pre-rinses, although the slope of the psychophysical function was slightly higher after water than after caffeine. These findings contradict Schiffman's findings of enhanced NaCl taste after adaptation to caffeine, using localised application and a matching procedure. Differences in procedure may account for these discrepancies but a failure to show an enhancement of NaCl taste with whole-mouth stimulation would mean that this effect would not be of importance in normal eating and drinking. AS

2612 Whitfield (FB), McBride (RL) and Ly Nguyen (TH). Flavour perception of chloroanisoles in water and selected processed foods. Journal of the Science of Food ano Agriculture 40(4); 1987; 357-365

The flavour thresholds and supra threshold intensities of 2,4,6 - trichloroanisole, 2,3,4,6-tetrachloroanisole and pentachloroanisole have been determined by sensory panels in various carriers. These are well known for their ability to cause musty or mouldy taint in foods and beverages. The concn. of chloroanisoles in the tainted dried fruit, fruit buns and plain buns was determined by GC-MS by the flavour panel. Results showed that threshold values for the chloroanisoles were 0.02-1.4, 0.2-5.8 and 2.2-183 ug kg resp. depending on the carrier. It was found that the threshold values increased for each chloroanisole in the order: water, dried fruit, fruit buns and plain buns. These values indicate the respective concn. levels at which the flavour of these carriers was affected by chloroanisole contamination which helps the industry to free the products from this form of contamination. NGKR

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Infestation control

Plodia interpunctella

2613 Johnson (JA) and Vail (PV). Adult emergence and sterility of Indian meal moths (Lepidoptera: Pyralidae) irradiated as pupae in dried fruits and nuts. Journal of Economic Entomology 80(2); 1987; 497-501

Raisins, almonds, and walnuts infested with pupae of the Indian meal moth, Plodia interpunctella (Hubner), were treated with gamma radiation (14.4-92.1 krad). Effects of radiation on adult emergence and reproduction were similar in all commodities. Adult emergence was reduced or eliminated at the two highest doses; adults that did emerge were deformed and unable to mate successfully. Females from pupae irradiated with 26.9-31.9 krad were completely sterile, whereas this dose only partially sterilized males. F1 progeny of irradiated parents showed a high degree of sterility; female progeny were less affected than males. Presence of partially sterile males after irradiation with 26.9-31.9 krad does not reduce the potential of this dose for eliminating infestations in dried fruits and nuts because irradiated males are unlikely to mate with untreated unmated females within irradiated products. AS

Rodents

2614 Arora (KK), Pahwa (R), Lal (S), Srivastava (JL) and Ashok Kumar). Rodent control in commercial grain warehouses in India. **Pesticides** 21(5); 1987; 12-13

2615 Mohana Rao (AMK) and Joshi (NC). Present status of rodent management in India. **Pesticides** 21(5); 1987; 9-11

Sitophilus zeamais

2616 Legg (DE), Barney (RJ), Tipping (PW) and Rodriguez (JG). Preferred grain quantity and insect density for maize weevil (Coleoptera: Curculionidae) interaction studies. **Journal of Economic Entomology** 80(2); 1987; 388-393

It was found that the maize weevils (**Sitophilus zeamais**) should be held on > 40 kernels to obtain the largest response in eggs and progeny per female and grain wt. loss regardless of weevil density. However only two females and the male per vial were necessary for determining effect of maize kernel density, genotype, ahd length of oviposition period on maize weevil biology. At least six females and three males per vial were needed to determine the total amount of damage to maize. It was determined that weevils should be allowed to oviposition for > 21 days. KAR

Pesticides

Fumigants

Ethylene dibromide

2617 Shivanandappa (T), Krishnakumari (MK) and Majumder (SK). Reproductive potential of male rats fed dietary ethylene dibromide. **Journal of Food Safety** 8(3); 1987; 147-155

Ethylene dibromide (EDB) which is used as a grain fumigant has been assessed in this study for its toxic effects while feeding to growing albino rats at 50, 100, 250 and 500 p.p.m. in the diet for 90 days. The results of these experiments showed that weekly body wt. gain was not affected. Organ wt. were normal and no histopathological lesions were seen in the liver, kidney, lungs, brain, spleen, adrenal glands and the testis. Enzyme activities viz. alanine aminotransferase (GOT), aspartate aminotransferase (GPT) alkaline phosphate (ALP) and lactate dehydrogenase (LDH) were not affected. EDB did not affect the reproductive performance of the male rats when mated with female rats. NGKR

Insecticides

2618 Huang (J) and Bushey (DF). Novel 1,3,4-oxadiazol-2(3H)-ones as potential pest control agents. **Journal of Agricultural and Food Chemistry** 35(3); 1987; 368-373

This report discusses biological results of the studies on a series of novel 1,3,4-oxadiazol-2(3H) -ones as potential pest control agents. Compared to the known insecticidal aromatic analogue these mole. are found to be less active and a probable reactive site of oxadiazolones with acetyl cholinesterase is also postulated. NGKR

Malathion

2619 Pandey (GP), Shiv Shanker Gupta (PC). Efficacy of malathion for controlling stored grain insect pests in godowns. **Bulletin of Grain Technology 25(1); 1987; 88-89**

This study was carried out to assess the efficiency of malathion in Food Corporation of India godowns to give concrete guidelines to field staff by treating stacks of wheat with different doses and mortality observed in stored grain insect sp. The results showed that malathion at recommended dosage of 0.15 g ai/m did not control the important insect pests of stored grains and urgent need of an alternate insecticide is indicated. NGKR

Rodenticides

2620 Chopra (G), Ahmad (N) and Parshad (VR). Laboratory evaluation of brodifacoum (talon rodenticide) against predominant murid species of Punjab. **Pesticides 21(5); 1987; 16-17**

The efficacy of brodifacoum against five murid species i.e. **Rattas ratus, Rattus meltada, Bandicota bengalensis, Mus musculus** and **Mus platythrix** occurring predominantly in Punjab is reported. BV

2621 Wagle (NG). Bromadiolone - A second-generation anticoagulant rodenticide. **Pesticides 21(5); 1987; 14-15**

BIOCHEMISTRY AND NUTRITION

Biochemistry

2622 Artz (WE), Bishop (PD), Keith Dunker (A), Schanus (EG) and Swanson (BG). Interaction of synthetic proanthocyanidin dimer and trimer with bovine serum albumin and purified bean globulin fraction G-1. **Journal of Agricultural and Food Chemistry 35(3); 1987; 417-421**

To evaluate the type of binding involved, thermodynamic analysis of the temp. dependence of proanthocyanidin binding to bovine serum albumin (BSA) and bean glycoprotein G-1 (G-1) was investigated. Binding was analyzed with tritiated proanthocyanidin by ultrafiltration to separate free ligand and protein-bound ligand. Binding constants were determined from Scatchard plots. Van't Hoff plots indicated proanthocyanidin binding to native G-1 protein was also BSA was spontaneous and entropy driven. Analysis with cis-parinaric acid supported the conclusion drawn from the thermodynamic analysis that the binding of proanthocyanidin to BSA was a hydrophobic interaction. Van't Hoff plots indicated proanthocyanidin binding to native G-1 protein was also spontaneous but, in contrast to BSA, enthalpy driven. Analysis with cis-parinaric acid confirmed the hydrophilic character of proanthocyanidin binding to native G-1. Evaluation of proanthocyanidin binding to heat-denatured G-1 with cis-parinaric acid indicated hydrophobic interactions. AS

2623 Asquith (TN), Uhlig (J), Mehansho (H), Putman (L), Carlson (DM) and Butler (L). Binding of condensed tannins to salivary prolilne-rich glycoproteins: The role of carbohydrate. **Journal of Agricultural and Food Chemistry 35(3); 1987; 331-334**

The role of carbohydrate in the binding of tannins to salivary proline-rich proteins has been examined. The results suggest that oligosaccharides enhance the affinity and selectivity of binding to tannins and increase the solubility of the resulting tannin/glycoprotein complexes. NGKR

2624 Bukovits (GJ) and Lezerovich (A). Determination of individual tocopherols by derivative spectrophotometry. **Journal of the American Oil Chemists" Society** 64(4); 1987; 517-520

The second order derivative UV spectra of Alpha, Beta, Gamma- and Delta-tocophoerols showed small differences that allowed development of a derivative spectrophotometric method for determining individual tocopherols in a mixture. The procedure consists of measuring the second derivative spectrum of the sample at four specified wavelengths and calculating each concn. by means of a method for multicomponents anlaysis that uses mixtures as standards. Vegetable oils and other fatty products usually require a previous clean-up process (under study)in order to remove interfering substances. AS

2625 Defibaugh (PW). Evaluation of selected enzymes for thiamine determination. **Journal of the Association of Official Analytical Chemists** 70(3); 1987; 514-517

Seven commercially available enzymes for use in liquid chromatographic method of separation and detn. of thiamine and its phosphate esters were evaluated. MVG

2626 Eastwood (M). Dietary fibre and the risk of cancer. **Nutrition Reviews** 45(7); 1987; 193-198

Nutrition

2627 Vijayalakshmi (P) and Rajammal Devadas (P). Impact and supplementation of vitamin A along with iron to expectant mothers. **Indian Journal of Nutrition and Dietetics** 24(5); 1987; 130-135

Improving the vitamin A status of the expectant mothers will help in preventing child blindness and hence in this study an effort was made to supplement vitamin A to the expectant mothers to assess the role of vitamin A in the haemopoietic activity of the expectant mothers. Results showed that inclusion of vitamin A has a beneficial haemopoietic effect. The serum retinol levels of the three groups of expectant mothers who received varying combinations of vitamin A and iron and control indicated that the vitamin A and iron supplemented group recorded highest value of serum retinol (31.1 µg) than all other groups. Vitamin A supplemented group 30.26 µg, iron supplemented group 17.75 µg and the control 15.3 µg. This showed that vitamin A supplementation improved the haemopoietic activity in anemic mothers. NGKR

TOXICOLOGY

2628 Capar (SG) and Loges (M). Lead content of foods stored in cans after opening. Journal of Food Safety 8(3); 1987; 187-197

The effect on the lead concn. in canned foods stored in their lead soldered cans after opening was studied by periodically monitoring lead concn. during 5 days or 14 days after can opening. It has been found that fruit juices and strong acid foods had the highest lead concn. during storage. Hence these results of study support the recommendations against storing acidic foods and juices in their opened cans. The lead was determined by differential pulse anodic stripping voltametry for these studies. NGKR

2629 Gravani (RB). Food Science Facts. Dairy and Food Sanitation 7(4); 1987; 192-197

Five major types of chemical food poisoning agents, including metals, poisonous chemicals (cleaning compounds, pesticides), intentional food additives, poisonous plants and animals, is highlighted and reviewed. 28 references. BV

Bacteria

2630 Aeschbacher (HU), Wolleb (U) and Borchet (L). Liquid preincubation mutagenicity test for foods. Journal of Food Safety 8(3); 1987; 167-177

For the evaluation of unextracted food products containing otherwise high levels of interfering histidine a bacterial mutagenicity test has been described in this paper. This system uses Ames tester strains preincubated with food samples followed by centrifugal separation and washing of cells prior to plating in the complete absence of L-histidine. This test can be considered as a suitable method for testing unextracted complex mixtures but quantitative evaluation is only feasible within limits. NGKR

Mycotoxin

2631 Benjamin (TL) and Radlo (J). New advances in detection of mycotoxins in raw grains, processed feeds and foods. Poultry Tribune 93(4); 1987; 34-36, 47

Covers imunodiagnostic assays for detection of toxins, monoclonal vs polyclonal antibodies, use of hybridomas to produce monoclonal antibodies and types of immuoassays (RIA - Radioimmuo assays, ELISA). BV

FOOD LAWS AND REGULATIONS

Nil

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In recent times energy conservation and renewable sources of energy have become the thrust areas and food industry is not an exception to this. To help those engaged in food and allied industries and also to those who are engaged in energy research and policy making, we have made an attempt to collect and provide all the relevant references from diverse sources including primary and secondary periodicals received at the CFTRI Information Centre. About 1500 references published during 1970-1984 have been collected scrutinized and classified under appropriate sections based on their relevancy. These sections include:

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FOOD TECHNOLOGY ABSTRACTS

Vol.22 No.12
December 1987

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ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm,cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet

g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal,kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg,ml,mm)
m-equiv	milli-equivalent
$\mathcal{M}$	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-(10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
$\mathcal{P}$	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)

rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
μ	micro-(as in μg, μm)
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

GENERAL

2632 Lal Kaushal (BB). Post-harvest handling of horticultural produce. **Indian Horticulture** 32(1); 1987; 40-42

The preparatory operations for handling of horticultural crops including sorting, grading, packing, curing, washing, waxing, bunching and precooling are described. MVG

FOOD PROCESSING

Nil

FOOD PACKAGING

2633 Robertson (G). Packing liquids in NZ. **Food Technology in New Zealand** 22(3); 1987; 16-17

This review discusses the packaging media used for liquid foods such as milk, soft drinks, fruit juices and alcoholic beverages in New Zealand. Various aspects of developments in aseptic filling and packaging in larger pack sizes, P.E.T. Bottles (polyethylene Terephthalate) and cans and the response to such developments for packaging suitability as compared to traditional packaging media of glass and metal have been covered. NGKR

FOOD ENGINEERING AND EQUIPMENT

Engineering

2634 Berry (MRJr) and Bush (RC). Establishing thermal processes for products with broken-heating curves from data taken at other retort and initial temperatures. **Journal of Food Science** 52(4); 1987; 958-961

Heat penetration data were obtained at high and low retort temp. and at high and low product initial temp. in two can sizes for five products displaying broken heating in a still retort. Extrapolation of data to a higher retort temp. was found to be an acceptable (conservative) practice for process establishment. For 300 x 400 cans of corn in brine predicted processing time was 9.7 min for a 128 C process establishment. For 300 x 400 cans of corn in brine predicted processing time was 9.7 min for a 128 C process on the basis of data obtained at 116 C. The actual required time was 8.5 min Conversely data extrapolated to a lower retort temp. were not acceptable. Initial temp. influenced processing times by as much as 50% for some products; the highest initial temp. intended for establishment of the process must be used for the heat penetration test. AS

2635 Knutson (KM), Marth (EH) and Wagner (MK). Microwave heating of food. **Lebensmittel-Wissenschaft und-Technologie** 20(3); 1987; 101-110

This review discusses various aspects of the application of microwave heating to food. Aspects covered include principles of microwave energy (physical characteristics and safety standards), considerations of microwave use (energy savings, time savings, acceptability of products to the consumer, temp., behaviour in microwave-heated foods and levels of nutrients and chemicals), inactivation of microorganisms in non-food systems, survival of microorganisms in microwave-heated foods (poultry, beef, fish, pork, wine and milk) and institutional and industrial application of microwaves (tempering, dehydration, blanching, cooking, pasteurization and sterilization). 79 references. BV

2636 Peleg (M) and Normand (MD). Computer simulation of the attrition patterns of particulated and agglomerated foods. **Journal of Food Science** 52(4); 1987; 943-947

Attrition processes were simulated using a set of mathematical expressions that describe the bimodal size distribution of the attrited particles and their temporal relationships. It is demonstrated that the dominance of a particle shattering mechanism or surface erosion as well as any of their combinations can be described in terms of the magnitude and ratios of only three empirical parameters, provided the initial conditions and other physical characteristics of the system are known. AS

2637 Pham (QT). Calculation of thermal process lethality for conduction - heated canned foods. **Journal of Food Science** 52(4); 1987; 967-974

A method which is generally applicable for calculating sterilising values from temp. curves for conduction heated canned foods has been devised by a simple algebraic formula that enabled to calculate temp. and sterilising value from each other to within 3%. A regression equation and a table were presented. NGKR

ENERGY IN FOOD PROCESSING

2638 Wood (RM) and Hasan (M). Improved heat exchanger networks for energy conservation in palm oil refineries. **International Journal of Food Science and Technology** 22(3); 1987; 209-218

The design of a heat recovery network of exchangers used in palm oil refining has been examined using pinch technology targeting procedures. The network was found to be well designed for the situation where steam is a cheaper utility than hot oil. These allowed a significant reduction in heat exchanger surface area for the same energy consumption, or a 25% reduction in energy consumption for a modest increase in network area of about 10%. BV

FOOD CHEMISTRY AND ANALYSIS

2639 Fujii (R), Arimoto (K) and Zinkel (DF). Dimeric components from the dimerization of abietic acid. **Journal of the American Oil Chemists" Society** 64(8); 1987; 1144-1149

The application of capillary column GLC for the dimerized resin acids and the isolation and partial characterization of six abietic acid dimers has been reported in this study. Results showed the presence of some 40 dimeric components. The three major components isolated were shown to be heptacyclic dimers, two of which having conjugated double bonds. Three dimers consisting of monomers connected through a single carbon bond and one carboxyl group in each of these dimers in the form of v-lactone have also been isolated. NGKR

2640 Herbel (W) and Montag (A). Hydrolysis of bound purine and pyrimidine bases in foods and computer directed calculation of nucleic acid content. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 184(1); 1987; 8-10 (De).

In order to determine the amount of combined purine and pyrimidine bases in foods the chemical fundamentals of their hydrolytic digestion were investigated. It was demonstrated that the digestion mixture used, containing trifluoracetic- and formic acids, protected the purine bases during hydrolysis from oxidative degradation due to carbon monoxide formation. A time-saving computer-program was developed and presented . This program allows, depending on the purine composition, the calculation of the corresponding nucleic acids, the nucleotides and the purine-nitrogen-content of the food. AS

Chemistry(Analytical)

2641 Davies (AMC) and Grant (A). Review: Near infra-red analysis of food. **International Journal of Food Science and Technology** 22(3); 1987; 191-207

This review provides a basic understanding of near infra-red (NIR) spectroscopic analysis and its scope in food analysis. The theoretical and statistical framework, and the extent of applications is presented. Also discussed are development of a NIR method and the difficulties and limitation of the method, online methods of using NIR analysis and application for the future use of NIR in the food industry. 73 references. BV

FOOD MICROBIOLOGY AND HYGIENE

Ethyl alcohol

2642 Melick (MR), Karim (MN), Linden (JC), Dale (BE) and Mihaltz (P). Mathematical modeling of ethanol production by immobilized **Zymomonas mobilis** in a packed bed fermenter. **Biotechnology and Bioengineering** 29(3); 1987; 370-382

A mathematical model which describes ethanol production in a packed bed fermenter containing **Zymomonas mobilis** entrapped in small spheres of calcium alginate within a packed bed fermenter has been developed. The equations combine simultaneous diffusion and reaction as well as a complex flow pattern to calculate glucose and ethanol profiles in the column type reactor. As part of the study, diffusivity values for glucose and ethanol in cell-loaded calcium alginate were determined. Also a free-cell kinetic expression for **Z. mobilis** at 33 C and pH 6.0 was developed. Comparison of the model with actual experimental results were made showing average deviations of Ca. 30-40%. AS

Microorganisms

Fungi

2643 Lin (HH) and Cousin (MA). Evaluation of enzyme-linked immunosorbent assay for detection of molds in foods. **Journal of Food Science** 52(4); 1987; 1089-1094, 1096

Enzyme-linked immunosorbent assay (ELISA) was used to detect **Alternaria alternata, Geotrichum candidum,** and **Rhizopus stolonifer** in processed fruit and vegetable products, bread, and cottage cheese. ELISA readings correlated with the amount of added mold and generally low backgrounds were obtained from control food samples. For bread and cottage cheese, the dilution factor affected the efficiency of the assay. Both viable and nonviable molds could be detected. The ELISA method gave results that correlated with those of the Howard mold count. The assay was relatively specific, although cross reaction was observed among some molds. The major antigenic components were polysaccharide in nature. AS

Alternaria palmi

2644 Sanjeev Agrawal) and Dutta (SM). A thermostable Beta-galactosidase from **Alternaria palmi. Journal of Food Science and Technology, India** 24(5); 1987; 211-214

It was reported that a strain of **Alternaria palmi** produced Beta-galactosidase which did not lose activity when heated to 65 C for 45 min. unlike that from **Kluyveromyces fragilis** which is thermolabile. Therefore this enzyme was purified by acetone fractionation, ultrafiltration through amicon filter PM-30 and column chromatography on DEAE-Sephadex A-50. It had a mol. wt. of about 160,000 daltons by SDS polyacrylamide gel electrophoresis. The max. activity of the enzyme was between pH 5.0 and 5.5 and at 65 C. When heated to 65 C for 2 h only 25% of activity was lost. The Michaelis constant (K_m) and max. velocity (V_{max}) with ortho-nitrophenyl Beta-galactopyranoside as the substrate were 0.8 mM and 0.14 μ moles/mg protein/min resp. The enzyme activity was not affected by metal ions and group specific reagents. MVG

Aspergillus niger

2645 Tsay (SS) and To (KY). Citric acid production using immobilized conidia of **Aspergillus niger** TMB 2022. **Biotechnology and Bioengineering** 29(3); 1987; 297-304

Batchwise culture for citric acid fermentation by immobilized conidia was superior to free conidia as it yielded over 70 g/L citric acid from runs 2-4 and maintained a long period (31 days) of citric acid production. However, the citric acid yield for run 5 (38 days) dropped quickly. Way and means of maintaining a longer period of citric acid production by immobilized conidia are being studied. MVG

Mushrooms

2646 Cavazzoni (V), Adami (A), Aragozzini (F) and Craveri (R). Fatty acid composition of mycelial biomasses of some mushrooms. **Lebensmittel-Wissenschaft und-Technologie** 20(3); 1987; 133-136

The cellular fatty acid composition of 11 strains of basidiomycetes and of three strains of ascomycetes grown in was determined by gas-liquid chromatography. Total lipid content varied from 5.5 to 27.4% of mycelial dry wt. for a medium of C:N ratio 54. Significant amounts of fatty acids, approx. 44-98% of total lipids were found and the unsaturated fatty acid fraction ranged from 51 to 80%, of total fatty acids. The $C_{16:0}$ (10.2-36.5%), $C_{18:1}$ (5.0-38.3%) and $C_{18:2}$ (17.7-23.7%) acids were the main components. AS

2647 Konanyakam (M), Sastry (SK) and Anantheswaran (RC). A method to determine shrinkage of mushrooms during processing. **Journal of Food Science and Technology, India** 24(5); 1987; 257-258

A liquid displacement procedure to measure vol. of porous biological material like mushrooms that are of low density has been developed. A glass container with a overflow spout and a long stem level was fabricated. The funnel was so sized and shaped that a mushroom can be enclosed within the funnel. The sample was immersed in the container with water treated with a surfactant as the displacement liquid in the container. The technique was found reliable for determining shrinkage of mushrooms during processing. MVG

2648 Paakkonen (K) and Kurkela (R). Effect of drying method on the water sorption of blanched northern milk cap mushrooms (**Lactarius trivialis**) at different temperatures. **Lebensmittel-Wissenschaft und-Technologie** 20(3); 1987; 158-161

Water sorption isotherms of Northern Milk Cap mushroom (**Lactarius trivialis**) preparations dried after blanching with room temp. air or with heated air were determined by the interval sorption method at 10 and 35 C. Freeze dried material, blanched and unblanced, was used as a reference. Blanching increased the water holding capacity in desorption. The effect of the drying method on adsorption was different at 10 C from that at 35 C. In desorption at 35 C, the blanched material dried with heated air gave up more water than the unheated samples, indicating physical changes in blanched material caused by heating in the drying process. The effects on sorption of differently dried material, indicate that even relatively mild heat treatment causes some transitions in the water insoluble fraction of mushroom material. AS

BIOTECHNOLOGY

2649 Whitaker (RJ) and Evans (DA). Plant biotechnology and the production of flavour compounds. **Food Technology** 41(9); 1987; 86, 88, 90, 92, 94,

Production of flavour compounds in plants and tissue cultures is discussed. Aspects covered include: secondary metabolites, flavour compounds, plant tissue culture biotechnology (somaclonal variation, gametoclonal variation, protoplast fusion, clonal propagation) agricultural chemical production, cell culture chemical production, genetic stability, biotransformation, bioreactor development, and future trends. 34 references. BV

Single cell proteins

2650 Gnan (SO) and Abodreheba (AO). Single-cell protein from methanol with **Enterobacter aerogenes**. **Biotechnology and Bioengineering** 29(3); 1987; 355-357

An identified **Enterobacter aerogenes** utilizing methanol as a sole carbon source was studied for the optimization of biomass production and the reduction of its nucleic acid content. Results indicated that the highest yield and conversion were obtained at 0.5% methanol. The addition of seawater as a source of trace elements has an adverse effect. However, the addition of urea as source of nitrogen enhanced the gorwth of E. aerogenes. Heat shock at 60 C for 1 min followed by incubation at 50 C for 2 h caused 72.6% reduction in the nucleic acid. AS

TISSUE CULTURE

Nil

FOOD ADDITIVES

Emulsifiers

2651 Tran (KM) and Einerson (MA). A rapid method for the evaluation of emulsion stability of non-dairy creamers. **Journal of Food Science** 52(4); 1987; 1109-1110

A rapid method based on the Lowry protein assay was developed for the detn. of the emulsion stability of non-dairy creamers in a model system. The method used the detergent and crystallization properties of the anionic surfactant sodium dodecyl sulphate to solubilize the casein present in the creamers. Increasing concn. of the divalent cations Ca++ and Mg++ resulted in an increasing degree of emulsion breakdown in a commercial non-dairy creamers. Significant differences in the emulsion stability of five commercial non-dairy creamers were also demonstrated with this method. AS

Emulsions

2652 Dickinson (E) and Stainsby (G). Progress in the formulation of food emulsions and foams. **Food Technology** 41(9); 1987; 74, 75, 76-81, 116

Recent progress in the formulation of food emulsions and foams with reference to aspects of manufacture, stability cream liqueurs, protein modification, soft drinks and lipid-tolerant foams. BV

Vitamins

2653 Newsome (RL). Use of vitamins as additives in processed foods. **Food Technology** 41(9); 1987; 163-168

The role of vitamins in food processing is described. Vitamins (ascorbic acid, ascorbyl palmitate and tocopherols) added to foods provide specific technical functions, such as protection of the quality of canned or bottled beverages, extension of shelf life of margarine and vegetable oils by inhibition of degradative reactions with oxygen. Vitamins added supplement the nutrient content of food products through fortification to enhance their original nutrient content or to restore nutrient lost during processing. Other aspects covered include vitamins as colorants nutrition labeling. BV

CEREALS

2654 Dube (R), Indrani (D), Leelavathi (K) and Sidhu (JS). Flour mill streams. I. Physico-chemical and rheological characteristics. **Indian Miller** 18(1); 1987; 17, 19, 21, 23, 25,

Physico-chemical and rheological characteristics of different flour streams (four breaks, five reductions and two purifications) obtained from the Punjab wheat were studied at the Buhler pilot flour mill. The streams showed a wide variations in protein (8.5 to 13.2%) wet gluten (21.3 to 38.9%), ash (0.38 to 1.34%) damaged starch(4.7 to 17.4%), diastatic activity (118.2 to 229.8 mg), yellow pigments (1.34 to 2.45 p.p.m.), colour grade value (1.8 to 12.0) and gassing power (202 to 385 mm). Relative to reduction and straight run flour, the break flours showed higher protein, higher wet gluten, low starch damage and strong dough characteristics. By contrast the tailend flour streams were characterized by higher starch damage, lower wet gluten and weaker dough characteristics. MVG

2655 Nilsson (U), Oste (R) and Jagerstad (M). Cereal fructans: Hydrolysis by yeast invertase. In vitro and during fermentation. **Journal of Cereal Science** 6(1); 1987; 53-60

The hydrolysis of wheat fructans by purified yeast, invertase and during fermentation of wheat doughs by bakers' yeast has been studied and results presented in this paper. For this study cereal fructans isolated from wheat flour were fractionated into tri-, tetra-, penta- and the higher mole. wt. oligo- and polysaccharides. These fractions were used as substrates for both commercial invertase and bakers' yeast and were compared with sucrose and inulin. The optimal pH for hydrolysis with invertase was in the range 4.5-5.0 for all substrates except inulin which showed an optimum pH at 6.0. In comparison with sucrose the fructan fractions were hydrolysed at these rates: tri-(14-17%); tetra-(10-12%); penta-(9%) and the two higher mol. wt. fractions between 2 and 7%. It was seen during one hour of fermentation most of the tri, tetra and penta saccharides disappeared to half of the initial concn. NGKR

2656 Parthasarathi (A), Leelavathi (K), Selvaraj (A) and Sidhu (JS). Flour mill streams. II. Suitability for different baked products. **Indian Miller** 18(1); 1987; 35, 37, 39, 41, 43-5

Studies were carried out on the different flour streams (four breaks, B_1 - B_4, and five reductions, C_1-C_4) as obtained at the Bhuler pilot flour mill for their suitability for bread, cakes, biscuits and cookie making. These streams showed a vide variation in their baking characteristics. The best overall bread making quality was exhibited by B_1, B_2, C_1 and C_2 flour streams, but B_3 and C_3 flour streams gave satisfactory performance in these products. The best overall cake making quality was exhibited by B_2, C_1, C_2 and C_4 flour stream, although B_1, B_3 and C_5 gave satisfactory results. AS

2657 Sapirstein (HD), Neuman (M), Wright (EH), Shwedyk (E) and Bushuk (W). An instrumental system for cereal grain classification using digital image analysis. **Journal of Cereal Science** 6(1); 1987; 3-14

This article describes the methodology and its application for the discrimination and classification of grain samples of barley, oats and rye whose admixture in hard red spring wheat represents an important grade determining factor in most commercial grain inspection and grading systems. A digital image processing system has been described in this paper to facilitate objective inspection and classification of cereal grains. It was found that approx. 1% of over 1100 kernels tested were incorrectly classified among wheat oats barley and rye in an admixture. The feasibility of the methodology for instrumental detn. of foreign material in grain grading is presented in this paper. NGKR

2658 Stuart (IM), Loi (L) and Fincher (GB). Immunological comparison of (1-→3,1-→4)-Beta-glucan endohydrolases in germinating cereals. **Journal of Cereal Science** 6(1); 1987; 45-52

The levels of (1-→3,1-→4)-Beta-glucanases in germinating cereal grains have been compared and the enzymes further examined using antibodies against the barley isoenzyme I. It was found that in extracts of germinating barley and rice, enzyme activity was relatively high and significant activity was detected in wheat, rye, triticale and oats while low levels were present in maize, sorghum and millet. Although high levels of (1-→3, 1-→4)-Beta-glucanase activity were detected in germinating rice, the antibodies reacted only very weakly with proteins in rice extracts, suggesting significant amino acid sequence differences between the barley and rice enzymes. NGKR

Barley

2659 Mekis (E), Pinter (G) and Bendek (G). Modified fluorimetric flow-injection-analysis (FIA) method for the determination of (1→3) (1→4)-Beta-D-glucan. **Journal of the Institute of Brewing** 93(5); 1987; 396-398

A simple system has been constructed for the quantitative detn. of barley Beta-glucans. Measurements were made by the flow-injection-analysis (FIA) technique using the fluorescent dye Calcofluor as a specific reagent for (1-→3) (1-→4)-β-D-linkages. In this paper a single-line system is described involving only one pump samples of Beta-glucan being directly injected into the reagent stream. The reaction results in an increased intensity of fluorescence detected by a flow-through-cell fluorimeter and evaluated as peak heights or peak areas by a printer-plotter. The analysis is completed within 20 s. The operational parameters were set during an optimization procedure. AS

2660 Weber (FE) and Chaudhary (VK). Recovery and nutritional evaluation of dietary fiber ingredients from a barley by-product. **Cereal Foods World** 32(8); 1987; 548-550

Briefly discusses properties of barley flours, inhibition of cholesterol biosynthesis, adsorption and binding, effect on health and laxation. BV

Oats

2661 Oomah (BD). Characteristics of commercially heat-treated oat groats. **International Journal of Food Science and Technology** 22(3); 1987; 299-308

Oat groats, sampled at various steps in the commercial production of oat flour, were examined to determine the effects of heat treatment on oat quality. The samples were: original cleaned milling oats, conditioned groats, dried groats and cutmeal. The amount of oat protein solubilized by different concn. of sodium dodecanoate was indicative of the degree of heat treatment received during processing

Pasting characteristics of conditioned groats were lower than those of other oat samples. Dry groats and cutmeal samples had similar protein solubility and pasting characteristics. Lipase activity of grain samples, except cutmeal, were lower than those of flours obtained from them; that of dried groats was negligible. Differences were observed in the three endothermic transitions (starch, protein and amylose-lipid complex) in the differential scanning calorimetry (DSC) thermograms of oat samples. AS

Oat bran

2662 Seibert (SE). Oat bran as a source of soluble dietary fiber. **Cereal Foods World** 323(8); 1987; 552-553

Paddy

2663 Ratna Sudhakar (T), Joga Rao (V), Krishna Rao (V), Sreerama Murthy (K) and Narayana Rao (PV). Effect of parboiling on milling quality of paddy from brown plant hopper affected crop. **Andhra Agricultural Journal** 34(1); 1987; 93-94

Homogeneous grain samples from nine paddy var. collected from healthy and brown plant hopper (BPH) infested farmer's field were parboiled in the laboratory and milled. The milled samples were separated into brokens and head rice and % of brokens was calculated on wt. basis. Results showed that parboiling reduced the % of brokens in both infested and healthy samples; parboiling had greater effect in reducing the brokens in infested samples. MVG

Rice

2664 Engels (C), Hendrickx (M) and Tobback (P). Limited multilayer desorption of brown, parboiled rice. **International Journal of Food Science and Technology** 22(3); 1987; 219-223

Two mathematical models, the BET-equation and the caurie equation, are used to analyse experimental desorption isotherms of two long-grain var. of brown, parboiled rice at different temp. The desorption characteristics of two long-grain parboiled brown rice var. (Le Mont and La Belle) show a higher absorption of water for Le Mont. Fitting the BET- and the caurie-model on the data the estimates of the monolayer moisture content obtained by the first model were lower than these obtained by the second model. The max. number of sorbed water layers estimated by the caurie-model decreases from 6.2 to 3.0 for La Belle and from 9.5 to 3.9 for Le Mont when increasing the temp. from 3.8 to 50 C. An analysis of the isosteric heats of desorption show that at a moisture content higher than 20% further adsorbed water almost behaves as free water. AS

Rice bran

2665 Babcock (D). Rice bran as a source of dietary fiber. **Cereal Foods World** 32(8); 1987; 538-539

Rice flour

2666 Chrastil (J). Adsorption and diffusion properties of flours from different types of rice. **Journal of Cereal Science** 6(1); 1987; 61-68

Three different U.S. var. of rice flour have been studied for the adsorption of acid and basic dyes by new kinetic analytical methods. The rice flour protein mostly glutelin (80-95% of the total protein) was found to have nucleophilic character. The dye absorption of medium rice grains was found to be different from the other two rice grains and the experiments revealed indirectly the differences in protein structures and in the diffusion resistance structure of rice flours and starches. NGKR

Wheat

2667 Bakhshi (AK) and Bains (GS). Study of the physico-chemical, rheological, baking and noodle quality of improved durum and bread wheat cultivars. **Journal of Food Science and Technology, India** 24(5); 1987; 217-221

Representative samples of ten improved var. of durum (DWL 5023, DWL 5009, DWL: 5031, MPO 456, Bittern-'S', HI 8137, DWL 5061, HD 4571, Raj 2431 and DWL 5045) and two bread var. (WL 1562 and WL 711) were obtained from 1980-81 crop and studied for physico-chemical rheological and end use properties. Significantly higher pigments (Beta -carotene), protein, damaged starch and diastatic activity was found in durum flours. The dough development times of durum cv. were 0.9-2.1 min while of bread wheats were 2.4-2.8 min. They also had higher water absorptions attributed to higher starch damage. The loaf vol. of durum flours were less than those of bread wheat flours. Among the above cv. HD 4571, Bittern S, DWL 5061, DWL 5023, DWL 5009 and HI 8137 were outstanding with respect to noodle quality characterised by pigment content and gruel clarity. MVG

2668 Donovan (GR) and Baldo (BA). Lectins as cytochemical probes of the developing wheat grain. VI. Interactions of lectins with wheat storage proteins electrophoretically transferred to nitrocellulose. **Journal of Cereal Science** 6(1); 1987; 33-43

Proteins from wheat endosperm protein bodies were fractionated by SDS-polyacrylamide gel electrophoresis and electroblotted on to nitrocellulose membranes. The electroblotted proteins were incubated with biotin-labelled lectins having different sugar specificities. A number of lectins bound to the electroblotted proteins, and the specifities of the binding sites were tested using sugar inhibitors complementary to each of the lectins. The binding of the lectin from wheat germ (wheat germ agglutinin) was readily inhibited by low concn. of a complementary trisaccharide sugar N, N', N'' triacetylchitotriose, suggesting the presence of N-acetyl glucosamine-containing glycoproteins in wheat storage proteins. Acid hydrolysis of mature wheat, reduced gluten proteins and subsequent chromatography failed to show the presence of D-glucosamine. The general electroblotting technique has shown lectins to be useful probes for groups of wheat polypeptides and indicates their potential usefulness in the affinity purification of wheat proteins. AS

2669 Vu (AT) and Popineau (Y). An immunochemical study of two Gamma-gliadin components from common wheat. **Journal of Cereal Science** 6(1); 1987; 15-25

The immunochemical - properties of two components of Gamma-type gliadin (Gamma 44 and Gamma 46) from common wheat (**Triticum aestivum**) were studied. Two antisera were obtained by immunisation of rabbits with purified proteins. Small amounts of antigens were injected during immunisation, and denaturation agents, such as urea and detergents, were not employed. Indeed, with low doses of immunogen there were fewer antibodies directed against minor impurities in the immunogen. Such antibodies as were produced in response to lower immunogen doses were probably fewer in number but they were more specific and showed a higher acidity. Antigen-antibody reactions between antisera and Gamma 44, Gamma 46 and purified Alpha-, be and Omega- gliadin components have been studied by double-diffusion, intragel immunoadsorption and immunoelectrophoresis techniques. Antiesera Gamma 44 and Gamma 46 did not react with Alpha-, Beta- and Omega-components. Thus, antigenic determinants of Gamma-type gliadins are different from those of Alpha-, Beta- and Omega- types. In addition, Theta 44 and Gamma 46 components have common antigenic determinants, but each also has unique antigenic structures. AS

Wheat flour

2670 Flynn (AG), Panozzo (JF) and Gardner (WK). The effect of copper deficiency on the baking quality and dough properties of wheat flour. **Journal of Cereal Science** 6(1); 1987; 91-98

The effects of time and rate of foliar copper application on the baking quality and dough properties of flour from wheat grown on a copper deficient soil have been studied and results presented in this paper. The copper treatment was done by a foliar spray at tillering and/or booting stages of plant growth. Results showed that the copper application resulted in an increase in grain yield and resulting in slight improvement in the dough and baking quality. Plants which were not treated were stunted with delayed maturity and malformed heads. These treatments caused a significant improvement in both dough rheology and loaf volume. NGKR

2671 Maninder (K) and Bains (GS). Rain damaged wheat flour: Improving the breadmaking potential. **Indian Miller** 18(1); 1987; 5-7, 9, 11, 13, 15

An approach to use rain damaged wheat flour characterised by high alpha-amylase/low falling number/high maltose values for producing an acceptable bread by adopting the 'No-time' dough system method. The ingredient composition, specially the level of potassium bromate fermentation and proofing times could be controlled suitably to counteract the adverse effects of sprouting and producing an acceptable loaf of bread, depending upon the extent and nature of damage due to sprouting under high summer temp. and freedom from any toxins. MVG

Wheat proteins

2672 Lawrence (GJ), Moss (HJ), Shepherd (KW) and Wrigley (cW). Dough quality of biotypes of eleven Australian wheat cultivars that differ in high-molecular-weight glutenin subunit composition. **Journal of Cereal Science** 6(1); 1987; 99-101

A number of Australian wheat cv. consists of 2 or 3 biotypes that differ in HMW glutenin subunit composition (high mol. wt.) provided an opportunity to examine these relationships more directly by establishing pure lines of each of the biotypes within a cv. and comparing their cv. In this study using genetically similar stocks for comparison provides strong additional evidence that subunits 5+10 at the Glu-D locus confer significantly greater resistance than subunits 2+12. Further evidence is indicative of key roles of specific endosperm proteins in relation to functional properties. NGKR

2673 Zaccai (M), Pinthus (MJ) and Levy (AA). The effect of **Rht1** gene on grain protein content in tetraploid wheat **Triticum turgidum**. **Journal of Cereal Science** 6(1); 1987; 27-32

The purpose of this work was to study the relationship between plant height and grain protein content in tetraploid wheat and the involvement of the RhtI gene to be determined. This revealed 1% reduction in grain protein percentage which was attributable to the RhtI gene. This was studied in the absence of any possible effects due to culm length. It was seen that grains of plants homozygous for RhtI had on average 1.2% less protein than grains of plants homozygous for RHtI and RhtI groups. NGKR

MILLETS

Corn

2674 Suarez (C). Effectiveness of ethyl oleate dipping, steam blanching and other pretreatments on drying of corn kernels. **Lebensmittel-Wissenschaft und-Technologie** 20(3); 1987; 123-127

The relative effectiveness of ethyl oleate dipping for increasing the drying rate of sweet corn kernels was compared to dipping in petroleum ether, ethyl ether and steam blanching. All pretreatments greatly increased the drying rate of kernels as compared to untreated control samples. It is suggested that all these pretreatments act on the surface waxes, reducing the cuticular resistance to water loss which seems to be the main rate-controlling mechanism during drying. The beneficial effects of ethyl oleate are less for corn grain of lower moisture content (i.e. field corn). AS

2675 Weber (EJ). Carotenoids and tocols of corn grain determined by HPLC. **Journal of the American Oil Chemists" Society** 64(8); 1987; 1129-1134

A procedure with a shorter extraction time and quantitation for detn. of carotenoids and tocols in the same sample. Preparation of corn grain has been developed by high performance liquid chromatography and preliminary saponification of the corn samples to obtain complete extraction of the carotenoids and tocols. Results showed that for 15 inbreds the total carotenoids ranged from 16-77 µg/g dry wt and the total tocols from 30-128 µg/g dry wt. It was seen that in four inbreds total, carotenoids were concentrated in the horny endosperm (83 plus or minus 2%) and total tocols in the germ (77 plus or minus 6%). After a storage period of six months at room temp. the average loss of total carotenoids in four inbreds was found to be 42 plus or minus 4% whereas the total loss of tocols was found to be 5%. NGKR

Sorghum

2676 Stuart (SMA), Johnson (PE), Hamaker (B) and Kirleis (A). Absorption of zinc and iron by rats fed meals containing sorghum food products. **Journal of Cereal Science** 6(1); 1987; 81-90

This study was designed to determine the zinc and iron absorption by rats fed balanced diets containing freeze-dried sorghum food products native to Africa. NGKR

PULSES

Bengal gram

2677 Vijaya Khader) and Venkata Rao (S). Protein quality of Bengal gram dhal (Cicer arietinum). Andhra Agricultural Journal 34(1); 1987; 97-98

Effect of cooking (boiling) and autoclaving on the content of certain essential amino acids and PER values of three market samples of Bengal gram dhal was studied by incorporating in the diet. Different cooking methods resulted in variations of wt. gains and PER in the dhal samples. Autoclaving for 20 min at 10 psi did not affect protein quality while 45 min boiling reduced PER significantly. Either boiling or autoclaving, showed a non significant decrease in PER, while boiling as well as autoclaving significantly decreased PER. This may be due to the non availability of amino acids in vivo. MVG

Cowpeas

2678 Padmashree (TS), Vijayalakshmi (I) and Shashikala Puttaraj. Effect of traditional processing on the functional properties of cowpea (**Vigna catjang**) flour. **Journal of Food Science and Technology, India** 24(5); 1987; 221-225

The functional properties of cow pea flours, raw and those subjected to various traditional processing such as heating, wet boiling and pressure cooking, dry puffing and roasting, fermentation and germination were studied. The properties included N solubility (NS), water absorption capacity (WAC), fat absorption capacity (FAC), bulk density (BD), foaming capacity (FC), foam stability (FS) and emulsifying capacity. Heat treatment reduced NS. All treatments increased WAC. Heat treatments increased BD where as it was reduced by germination. Germination increased FAC while other treatments had no marked effect. Processed cow pea flour had lower foaming and emulsifying capacity. MVG

Faba beans

2679 Berot (S), Gueguen (J) and Berthaud (C). Ultrafiltraton of fababean (**Vicia faba** L.) protein extracts: Process parameters and functional properties of the isolates. **Lebensmittel-Wissenschaft und-Technologie** 20(3); 1987; 143-150

Ultrafiltration tests with mineral membranes were carried out on faba bean protein as alkaline soluble or acid precipitated extracts, at temp. between 30 and 60 C. The permeation flow rates and the characteristics of both permeates and retentates were measured during batch processing comprising two concn. steps separated by diafiltration. The dry matter contents, the recovery yields and the rheological properties of the retentates were studied as well as the functional properites of the resulting spray-dried isolates. The best permeation flow rates involved precipitated protein extracts at 40 or 50 C but ultrafiltration of alkaline extracts gave the best recovery yields. Isolates obtained by ultrafiltration showed lower water retention capacities but better whipping and thickening properties than standard ones. AS

Field peas

2680 Sosulski (FW) and McCurdy (AR). Functionality of flours, protein fractions and isolates from field peas and faba bean. **Journal of Food Science** 52(4); 1987; 1010-1014

This study has been undertaken to compare the chemical composition and functional properties of air classified protein fractions and protein isolates from field and faba beans which were obtained from commercial or experimental studies. Results showed that air classification process effectively doubled the protein concn. of field pea and faba bean flours without the marked decrease in nitrogen solubility which occured during protein isolation. The proteins of these flours and protein fractions exhibited high acid solubility and only a narrow range of insolubility at pH 4.5. These protein fractions exhibited excellent whippability and foam stability compared to soybean controls and their properties suggested potential applications in meat emulsions, beverages and bakery products. NGKR

Green peas

2681 Halpin (BE) and Lee (CY). Effect of blanching on enzyme activity and quality changes in green peas. **Journal of Food Science** 52(4); 1987; 1002-1005

This study was undertaken to optimise blanching conditions for green peas by analysing the effect of various time/temp. blanch treatments on the activity of four enzymes; peroxidase (POD) polyphenoloxidase (PPO), lipoxygenase and catalase and by monitoring enzyme and quality changes during frozen storage at -23 C. Result showed after analysing the stored peas for various enzyme activities, sensory quality colour and texture the enzyme activity varied upto 3 months and after that POD, PPO activity decreased or remained constant whereas lipoxygenase activity increased over storage. Sensory evaluation indicated a gradual loss of quality due to poor flavour in the long time/low temp. blanch. Ascorbic acid content, greenness and firmness gradually decreased with storage. NGKR

Peas

2682 Lasekan (JB), Harden (ML) and Yang (SP). Compositional, sensory and biological evaluations of supplemented pea **moin-moin**. **Lebensmittel-Wissenschaft und-Technologie** 20(3); 1987; 115-120

Moin-moin (a steamed West African food product produced from blackeye pea) was supplemented with melon seed or pollack fish flour. Proximate composition indicated that supplementation with 10 and 20% melon seed or pollack fish flour could significantly increase the protein content of blackeye pea **moin-moin**. Sensory results showed that blackeye pea-**moin-moin** could be supplemented with 10 and 20% melon seeds or 10% pollack fish flours without loss of sensory qualities. The evaluation of the protein quality of **moin-moin** by liver composition of mature rates did not show a clear improvement for the supplementations. Of all the liver analysis, only liver moisture content indicated a significant improvement of the protein quality of blackeye pea **moin-moin** with 20% melon seed and 10% fish flour supplementation. BV

2683 Shams (MA) and Thompson (DR). Quantitative determination of pea losses as affected by conventional water blanching. **Journal of Food Science** 52(4); 1987; 1006-1009

This study was undertaken to investigate if total losses of early June, mini sweet and medium sweet pea cvs. from commercial water blanching were a function of sieve size and tenderometer rating and to determine if recovery of blancher losses of small peas would justify by passing blanching for small sieve size peas effecting higher pea recovery and lower waste disposal. Results showed that by passing blanching and gravity separation for small sieve peas should increase the recovery of soluble solids in small peas for canning process by eliminating blancher losses and saving the sinkers present among the small tender peas. Moisture did not change significantly during blanching but increased after canning and alcohol insoluble solids increased for all sizes after blanching. NGKR

OILSEEDS AND NUTS

Groundnuts

2684 Chiou (RY-Y). Water adsorption of peanut kernels in a closed system with respect to moisture transfer. Journal of Food Science 52(4); 1987; 1105-1106

Adsorption isotherms of peanut kernels. Tainan 9 and 11, were determined at 30 C and used as reference to determine the water activity at equilibrium. The changes of the apparent water activity and moisture of three weighed dried kernels in closed systems stored with distilled water were determined in an electric hygrometer and a series of vessels at 30 C. A nonequilibrium state of moisture and apparent water activity gradients of the kernels was observed in the early stages of 144 h storage. In a 90 min experiment with the hygrometer at 30 C, the vapour adsorption rate and final apparent water activity decreased in order with the increase of the number of kernels, from 1 to 7, stored with saturated potassium dichromate salt (water activity = 0.98 at 30 C). Vapour adsorption rate and final apparent water activity of Tainan 9 were slightly higher than those of 11. AS

Pecans

2685 Resurreccion (AVA) and Heaton (EK). Sensory and objective measures of quality of early harvested and traditionally harvested pecans. **Journal of Food Science** 52(4); 1987; 1038-1040, 1058

This paper relates objective measures for colour and texture in pecans with subjective measures for colour and texture and preference as determined by a sensory laboratory panel. This report also covers study on consumer panel preference scores for colour and appearnace of the two groups of pecans. The results showed that significant differences, occur in colour, texture, size and total fat content between early harvested and traditionally harvested pecans. The differences found between EH and TH nuts for all measures support recommended early harvest practices. NGKR

Soybeans

Soy beverages

2686 Maga (JA) and Fapojuwo (OO). Carbohydrate composition of aseptically packaged soy-based drinks. **Food Science and Technology, USA** 20(3); 1987; 162-164

Gas chromatography was used to separate and quantitate the carbohydrates of 39 brands of aseptically packaged soy-based drinks produced in 12 countries. Carbohydrates detected and quantitated included fructose, glucose, sucrose, cellobiose, galactobiose, melibiose raffinose, stachyose and verbascose. Thirty-six of the samples contained measurable amounts of flatulence-producing raffinose while only seven had stachyose and two verbascose. The highest combined level of these three carbohydrates was in a United States product (1.72 g/100 ml) followed by one from Korea (1.20 g/100 ml) and two of the Japanese products (1.18 g and 0.88 g/100 ml, resp.). Drinks produced in Hong Kong had little or no flatulence-producing oligosaccharides. AS

Soy flour

2687 Verma (NS), Mishra (HN) and Chauhan (GS). Preparation of full fat s
flour and its use in foritification of wheat flour. **Journal of Fo
Science and Technology, India** 24(5); 1987; 259-260

Efforts were made to prepare full fat soy flour free from ant
nutritional factors for fortification of wheat flour for maki
chapatis. Soybeans, sand roasted, boiled for 5 min and steamed for
10, 15 and 20 min at 15 psi were sun-dried to 7-8% moisture conten
In steamed samples, min. trypsin inhibitor (TI) activity was observe
Steaming beyond 5 min at 15 psi was optimum as indicated by N solubi
ity indices. Different blends of full fat soy flour and wheat flo
were prepared and used for making chapatis by traditional metho
There was almost complete elimination of TI activity in chapatis a
indicated by the values (0.73 to 2.18%). Sensory evaluation showe
that chapatis containing 10% full fat soy flour was acceptable whil
those containing 25% full fat soy flour was neither liked nor dislik
ed. MVG

Soy sauce

2688 Shenoy (NR) and Choughuley (ASU). Nitrosamines in some Indian brand
of soya sauce samples treated with nitrite. **Journal of Food Scienc
and Technology, India** 24(5); 1987; 214-216

Nitrite treatment of soy sauce led to formation of at leas
three known carcinogenic nitrosamines, namely, nitrosodimethylamin
(NDMA), nitrosodiethylamine (NDEA) and nitrosopyrrolidine (NPYR)
Under these conditions 1-Methyl-1,2,3,4-tetrahydro-Beta-carboline aci
(MTCCA) whose nitroso derivative is known to be mutagenic is als
formed. However certain antioxidants contained in the soy sauce containing diet may offer protection against nitrosamines. MVG

Soy-whey yoghurt

2689 Paolielo (MMB), Reddy (KV) and Da Silva (RSF). Calcium sulohate as
organoleptic coadjuvant in the formulation of soy-whey yoghurt. **Food
Science and Technology, USA** 20(3); 1987; 155-157

A yoghurt analogue has been developed using principally dry soy milk, whey solids and skim milk powder. Calcium sulphate is added in small quantities to decrease soy astringency in the product. Response surface methodology was employed to optimise the soy milk content on the basis of sensory evaluation by a 32-member panel. The independent variables were dry soy milk (28.79-71.21 g/litre) and calcium sulphate (0.49-1.91 g/litre), each at five levels of variation. The most acceptable product contained 0.104% calcium sulphate, 50.32 g/litre dry soy milk and 3.56% protein. Brazilian commercial yoghurts have a protein content of a similar magnitude. Calcium-induced effects are mentioned in relation to their possible influence on soy astringency. AS

TUBERS AND VEGETABLES

Root vegetables

Carrots

2690 Park (YW). Effect of freezing, thawing, drying, and cooking on carotene retention in carrots, broccoli and spinach. **Journal of Food Science** 52(4); 1987; 1022-1025

In this study the carotene contents of fresh, frozen, cooked and dehydrated carrots, broccoli and spinach are determined, the effects of freezing thawing, drying and cooking on the carotene contents of these vegetables were evaluated, the retention of carotene in the vegetables under ordinary home cooking conditions were also evaluated. Results showed that dehydration irrespective of drying method reduced carotene in these vegetables which will be lower if the initial concn. are lower. It is also seen that frozen and thawed vegetables exposed to home environmental conditions for 4 h before cooking may not lose much carotene. These results are also applicable to those countries with few refrigeration systems. NGKR

Cassava

2691 Morales (E) and Graham (GG). Digestibility of boiled and oven-dried cassava in infants and small children. **Journal of Nutrition** 117(1); 1987; 129-132

Boiled fresh cassava or oven-dried cassava flour provided 50% of the energy and less than 10% of the protein in diets of convalescent malnourished infants; casein was added to complete 8% of energy as protein, and vegetable oil (soybean-cottonseed) was added to make 20% of energy as fat. Despite high wet wt. of feces (172 plus or minus 42 and 214 plus or minus 41 g/d), their dry wt. (20 plus or minus 2 and 22 plus or minus 2 g/d) and their energy (6.9 plus or minus 0.7 and 7.6 plus or minus 0.5% of intake) and nitrogen (17 plus or minus 3 and 20 plus or minus 3% of intake) contents were low, and their fat content (4.4 plus or minus 1.34 and 5.2 plus or minus 1.2% of intake) was very low. Cassava is a surprisingly effective source of energy which interferes little or not at all with digestion of added protein and fat in weaning diets. For its safe use, it is important that home or industrial processing almost completely eliminate its potential hydrocyanic acid content, and that a good quality protein supplement be consumed regularly in nutritionally adequate amounts. AS

Tubers

Potatoes

2692 Canet (W) and Hill (MA). Comparison of several blanching methods on the texture and ascorbic acid content of frozen potatoes. **International Journal of Food Science and Technology** 22(3); 1987; 273-277

The effects of three different blanching methods (blanching in boiling water, stepwise blanching and a mixed method using microwave heating) have been compared with the conventional process for blanching potatoes, on the texture and ascorbic acid content of frozen potatos immediately after blanching, and after freezing and reheating. After freezing and reheating the mixed method produced a similar texture to that obtained with stepwise blanching, and both were significantly better than conventional blanching. The mixed method shortened the process time and improved retention of ascorbic acid. BV

2693 Deniston (MF), Hassan (BH) and Merson (RL). **Heat transfer coefficients to liquids with food particles in axially rotating cans. Journal of Food Science** 52(4); 1987; 962-966, 979

Based on the theoretical dimensional analysis a correlation for the overall heat transfer coeff. in rotating cans was developed experimentally. Further experimentation is recommended to ascertain the importance of other parameters particularly food properties and can size. Overall heat transfer coeff. were correlated within plus or minus 25% with physical properties and operating variables by an equation derived by dimensional analysis. Film coeff. for heat transfer from water to potatoes in the can were determined by thermo couple measurement of potato surface temp. NGKR

2694 Gamble (MH), Rice (P) and Selman (JD). **Relationship between oil uptake and moisture loss during frying of potato slices from cv. Record U.K. tubers. International Journal of Food Science and Technology** 22(3); 1987; 233-241

This paper examines the variations in moisture content and oil content of samples of 1.5 mm thick slices of potato (cv. Record UK) after various frying times at frying temp. of 145, 165 and 185 C. The loss of moisture and the uptake of oil were found to be interrelated and both were linear functions of the square root of frying time. Within the temp. range examined, moisture loss and oil uptake were found to be independent of frying temp. From the data and visual obervations the mechanism of moisture loss and its influence on oil content in the final product were discussed. Suggestions are made for means of reducing the total oil content by modifications in the frying process. AS

2695 Shashirekha (MN) and Narasimham (P). **Inhibitory effect of mercuric compounds and dyes on decay and sprouting of seed potato tubers during storage. Journal of Food Science and Technology, India** 24(5); 1987; 225-229

Effect of 13 synthetic dyes were assessed for colouring the potatoes and inhibiting growth of **Fusarium oxysporum** and **Erwinia carotovora**, the two microbes causing spoilage during storage. It was indicated by ED_{50} values that brilliant green and malachite green were effective equally against microbes as compared to mercuric chloride. Use of these two dyes in combination with mercuric chloride was more effective than individually. The combination treatments reduced sprouting significantly. The above dyes, however, didnot have any inhibitory action on plant growth. The mercury residue in harvested tubers from treated seed tubers was well within permissible limits i.e. 0.025 µg/kg fresh wt. It was concluded that it would be better to use mercurial salts in combination with an antimicrobial dye to the control of decay of seed potatoes. MVG

2696 Suzan Kincal (N) and Giray (C). **Kinetics of ascorbic acid degradation in potato blanching. International Journal of Food Science and Technology** 22(3); 1987; 249-254

Degradation kinetics of ascorbic acid was investigated on potato strips wrapped in aluminium foil and blanched for 5-60 min at different temp. between 65 C and 100 C. The results confirmed that first order kinetics is adequate in describing the value of the rate constant was found to pass through a max. at 85-90 C, indicating the inactivation of oxidative enzymes around these temp. Comparison of the degradation losses based on the present investigation with results on total loss of ascorbic acid during blanching reported in the literature showed that thermal degradation accounts for a considerable portion of the total loss. AS

Sweet potatoes

2697 Walter (WMJr). Effect of curing on sensory properties and carbohydrate composition of baked sweet potatoes. **Journal of Food Science** 52(4); 1987; 1026-1029

This study has been caried out to compare the flavour and texture profiles and carbohydrate compositon of cured, baked 'jewel' sweet potatoes with baked, uncured 'jewel' sweet potaotes. Results showed that curing increased the rate of production of flavour notes and only slightly influenced development of moist mouthfeel. Sweet potatoes whether curd at harvest or not attain similar flavour note scores. Given sufficient time after harvest baked cured roots were not distinguishable from baked uncured roots and carbohydrate was not found to be a sensitive indicator. NGKR

Vegetables

2698 Winter (M), Brandl (W) and Herrmann (K). Determination of hydroxycinnamic acid derivatives in vegetables. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 184(1); 1987; 11-16 (De).

A method for sample preparation has been modified and developed for the detn. of hydroxycinnamic acid derivatives. After careful extraction the extract is fractionated by column chromatography on polyamide. The methanolic fraction contains the derivatives of hydroxycinnamic acids with glucose (ester and glucosides), and the methanol/formic acid extract of the polyamide column contains the quinic, tartaric and malic acid esters. This method was tested and confirmed with reference samples as well as with vegetable samples. Additionally this method effects a sample clean up. The samples were analysed by HPLC using a methanol gradient on a reversed phase system. In addition to the different **Brassicas** summer-squash, globe artichoke, leek, corn salad, rhubarb, scorzonera and carrot were investigated. The compounds analysed were found in greatly varying amounts in vegetable depending on the part of the plant analysed. AS

Cucumbers

2699 McFeeters (RF) and Lovdal (LA). Sugar composition of cucumber cell walls during fruit development. **Journal of Food Science** 52(4); 1987; 996-1001

This study was undertaken to analyse the sugar composition of the polysaccharides in the cell wall of cucumber mesocarp tissue during fruit development by analysis of seven cucumber sizes. It was found that relative to total cell wall sugars glucose did not change while other neutral sugars, galactose xylose and mannose underwent relatively small declines. The concn. of cell wall sugars was much higher in peel tissue than in mesocarp or endocarp tissue. The ratios of galacturonic acid/rhamnose and galacturonic acid/arabinose showed large increases during fruit growth which indicated that pectin structure may change and pectin methylation in the mesocarp tissue increased from 35 to 64% as the fruit matured and positive correlation was observed between firmness of cucumber mesocarp tissue and total number of cell wall sugars in the fresh tissue and these were in line with earlier studies. NGKR

Leafy vegetables

2700 Senter (SD), Bailey (JS) and Cox (NA). Aerobic microflora of commercially harvested, transported and cryogenically processed Collards (Brassica oleracea). Journal of Food Science 52(4); 1987; 1020-1021

This study was conducted to enumerate total aerobic bacteria, Enterobacteriaceae, yeasts and moulds and to identify the predominant Enterobacteriaceae encountered at different stages in a typical, well managed harvesting and processing operation for frozen green leafy vegetables. This provides a baseline for comparing the microbiological quality of these commodities in similar operations. Microbial counts were shown to increase with holding prior to processing and to be reduced by subsequent washings and blanchings. NGKR

Alfalfa

2701 Barbeau (WE) and Kinsella (JE). Formation of a gel from a heated emulsion of alfalfa leaf protein and peanut oil. Journal of Food Science 52(4); 1987; 1030-1032

Study was undertaken to investigate conditions for the formation of a gel from a heated emulsion of chloroplast free alfalfa leaf tissue juice and peanut oil and to determine the composition and properties of this gel to help evaluate the feasibility of this procedure for the separation of edible proteins from plant extracts. The proximate composition of this gel was found to be 40% moisture, 2% protein, 57% fat, 0.2% ash and < 1% carbohydrate. SDS-PAGE analysis of the gel suggested that fraction 1 or ribulose biphosphate carboxylase is the major protein component present. The apparent viscosity of the gel was less than 1/10th of mayonnaise. NGKR

Red bell peppers

2702 Gregory (GK), Chen (T-S) and Philip (T). Quantitative analysis of carotenoids and carotenoid esters in fruits by HPLC: Red bell peppers. Journal of Food Science 52(4); 1987; 1071-1073

This study was to develop rapid and direct quantitative analysis of red bell pepper carotenoids and carotenoid esters by HPLC method using an internal standard. The results by this method showed that red bell peppers contained 280 µg/gm total carotenoids out of which 60% was found to be capsanthin and 11% beta carotene and 20% capsorubin. Capsanthin was acylated with C_{12} to C_{18} saturated fatty acids. NGKR

Tomatoes

2703 Wang (SL). Microwave oven drying method for total solids determination in tomatoes: Collaborative survey. Journal of the Association of Official Analytical Chemists 70(4); 1987; 758-759

A survey was conducted among 8 laboratories in Ontario to check the reproducibility and accuracy of their microwave solids analyzers for total solids detn. in tomatoes, using the official AOAC microwave oven drying method. This study showed that the reliability of the AOAC method was closely related to the performance of the microwave solids analyzer for tomato samples. Certification of microwave solids analyzers was recommended to assure the validity of analytical results by the AOAC method. AS

FRUITS

Apples

2704 Coseteng (MY) and Lee (CY). Changes in apple polyphenoloxidase and polyphenol concentrations in relation to degree of browning. **Journal of Food Science** 52(4); 1987; 985-989

Polyphenoloxidase activity and polyphenol concn. decreased during maturation and remained constant during cold storage. It was shown that HPLC analysis of the phenolics in apples indicated no change in the types of phenolic compounds and no single compound could account for the differences observed in browning. NGKR

2705 Wright (DJr). New method for the determination of 1,1-Dimethylhydrazine residues in apples and peaches. **Journal of the Association of Official Analytical Chemists** 70(4); 1987; 718-720

A new method for determining 1,1-dimethylhydrazine (DMH) in peaches and apples is presented. The method consists of extraction with L-ascorbic acid, derivatization with 2-nitrobenzaldehyde to the corresponding hydrazone, and cleanup on an alumina column. The hydrazone derivative is determined by gas chromatography using an electron-capture detector. Recoveries were determined from 10 to 100 p.p.b. Stability of the UDMH residues on frozen peaches was investigated, and results indicate that the residues degrade even while frozen. AS

Blueberries

2706 Kim (MH) and Toledo (RT). Effect of osmotic dehydration and high temperature fluidized bed drying on properties of dehydrated rabbiteye blueberries. **Journal of Food Science** 52(4); 1987; 980-984, 989

In these studies rabbiteye blueberries were dried using a high temp. fluidised bed (HTFB) dehydrator and its properties were compared with commercially produced explosion puffed blueberry products. It was seen that the drying time is reduced using HTFB and dried product had less bulk density larger diameter faster dehydration time and higher dehydration ratio compared to commercial samples. HTFB increased drying rate and prevented stickiness of berries and thus improve the drying characteristics. NGKR

Date

2707 Ibrahim (M), Al-Ruqaie) and Hamza El-Nakhal. **Tamaroggtt - a new product from date and oggtt. Journal of Food Science and Technology, India** 24(5); 1987; 230-232

Pitted, minced date was mixed with fermented milk prepared from skim milk powder, the mixture shaped and dehydrated at room temp. with continuous aeration to produce a new product **Tamaroggtt**. The product is rich in protein, sugar and minerals and is also acceptable. It can be kept at room temp. without noticeable changes. MVG

Grapes

2708 Aguilera (JM), Oppermann (K) and Sanchez (F). Kinetics of browning of Sultana grapes. **Journal of Food Science** 52(4); 1987; 990-993

The studies on the basis of colour development in Sultana grapes during dehydration and its control showed that heat inactivation of polyphenol oxidase (PPO) activity in Sultana grapes between 83 C and 98 C followed zero order kinetics with an activation energy of 13.7-16.7 kcal/mol. Reaction rate for enzymatic browning increased with higher water activities while non-enzymatic browning showed max. water activity of 0.8 and PPO activity in the skins of the grapes was 31 times as great as in the flesh and light coloured raisins were obtained without treatment with sulphur dioxide by 2 min dip in 93 C water. NGKR

Kiwifruits

2709 Lodge (N), Nguyen (TT) and McIntyre (D). Characterization of a crude kiwifruit pectin extract. **Journal of Food Science** 52(4); 1987; 1095-1096

Pectin was extracted from whole kiwifruit at a mean yield of 0.85%. The analytical properties of the crude kiwifruit pectin extract were compared with those of a commercially available apple pectin. The kiwifruit pectin exhibited a high gelling temp. of 90 C. AS

Litchi

2710 Ajay Singh), Abidi (AB) and Surendra Srivastava). Variation in quality traits of litchi (**Litchi chinensis** Sonn.) cultivars. **Journal of Food Science and Technology, India** 24(5); 1987; 264-266

Four promising cv., Early large red, Calcutta, Muzaffarpur and Bedana were studied for physico-chemical composition. The values ranged as follows: fruit wt. 6.8-21.2 g, edible protein 61.7-84.4%, seed 3.3-26.1%, peel 12.2-19.5%, total soluble solids (TSS) 21.0-21.5%, total acidity 0.51-0.54%, moisture 80.0-82.0%, protein 1.12-1.20%, fat 0.21-0.35%, carbohydrates 16.06-17.9%, total minerals 0.52-0.55%, reducing sugars 5.60-6.44%, total sugars 15.51-16.22%, protopectin 0.11-0.14%, pectinic acid 0.41-0.57%, total pectins 0.55-0.71%, ascorbic acid 35.76-44.36 mg/100 g, tryptophan 1.17-1.34 g/16 g N, methionine 0.18-0.25 g/16 g N, anthocyanin (in skin) 0.30-0.38 O.D./10 discs and total phenols 116-151 mg/100 g fresh tissue. Of the four cv. Muzaffarpur was found superior. MVG

Mangoes

2711 Rodriquez-Luna (G), Segurajauregui (JS), Torres (J) and Brito (E). Heat transfer to non-newtonian fluid foods under laminar flow conditions in horizontal tubes. **Journal of Food Science** 52(4); 1987; 975-979

This study presents rheological properties, thermal diffusivity, density, thermal conductivity, heat transfer tests on mango and papaya nectars. These results should be helpful for interpreting heat transfer to pseudoplastic materials in the design of double the heat exchangers. NGKR

Melons

Cantaloupes

2712 Horvat (RJ) and Senter (SD). Identification of additional volatile compounds from cantaloupe. **Journal of Food Science** 52(4); 1987; 1097-1098

In this study the variations in the formation of stituents of cantaloupe during maturation were determined by direct headspace analyses and analysis of steam distillates of excised tissue using (GLC-MS) with a Perkin-Elmer model 300 and a flame-ionization detector. Thirty two compounds were identified. Headspace analysis of cantaloupe samples at six stages of maturity showed increases in total ethyl and acetate esters, acetaldehyde, ethyl acetate, and ethanol with maturation levels of these compounds remained low and relatively constant until the breaker stage and thereafter increased rapidly until the fruit was fully mature. NGKR

Prunes

2713 Somogyl (LP). Prunes, A fiber-rich ingredient. **Cereal Foods World** 32(8); 1987; 541-544

Prunes (**Prunus domestica**) are an outstanding source of dietary fiber, contain 16.1 g/100g fruit (23.3% moisture). Prunes with several distinctive properties from an attractive blend with cereal ingredients and may be of interest to cereal manufacturers seeking an attractive and economical fruit ingredient source. Nutritional qualities, and functional properties of prunes are the aspects covered. BV

CONFECTIONERY, STARCH AND SUGAR

Confectionery

Chocolates

2714 Boomgaard (THvan den), Vliet (Tvan) and Hooydonk (ACMVan). Physical stability of chocolate milk. **International Journal of Food Science and Technology** 22(3); 1987; 279-291

The stability of chocolate milk, made from two different cocoa powders and skim milk, was studied. Three types of instability could be distinguished: sedimentation of cocoa particles, formation of large flocs and formation of light and dark coloured layers (segregation). From adsorption studies and rheological measurements it could be deduced that chocolate milk behaves as a fluid with a weak network. The cocoa particles themselves are incorporated in this network structure. This network is formed by an interaction of protein and protein-covered cocoa particles in the presence of a suitable stabilizer (carrageenan). Heat treatment has a considerable effect on the interactions. Segregation is supposed to be caused by uniaxial compression of the total network due to gravitational force, and segregation will stop when the gravitational force is counter balanced by the elastic modulus multiplied by the deformation gradient of the network. The compression may be influenced by the adherence of the network to the container wall. AS

Starch

2715 Yener (E), Ungan (S) and Ozilgen (M). Drying behaviour of honey-starch mixtures. **Journal of Food Science** 52(4); 1987; 1054-1058

This study was focused on the drying phenomena of the thin layers of honey-starch mixtures and a mass transfer model with two falling rate periods was developed. Drying experiments with five different honey starch mixtures containing 0, 10, 20, 30 and 40% starch concn. Commercially available flower honey and wheat starch were used for these experiments and honey contained 72.4% invert sugar, 3.2%

sucrose and 0.2% ash on wet basis. It was seen that a simple mass transfer equation was sufficient to monitor the drying beaviour of honey starch mixtures. Starch which was needed to reduce the stickiness increased the drying times. Temp. decreased the drying times but above 80 C caramelistion started. NGKR

Sugar

2716 del Pilar Buera (M), Chirife (J), Resnik (SL) and Lozano (RD). Nonenzymatic browning in liquid model systems of high water activity: Kinetics of colour changes due to reaction between glucose and glycine peptides. Journal of Food Science 52(4); 1987; 1068-1070, 1073

This study concerns colour changes due to Maillard's reaction in model solutions containing glucose and glycine peptides and having water activity adjusted to 0.90 by the addition of sodium chloride. The browning of such peptide-carbonyl subsystems has a special significance in the food area since natural peptides as well as protein hydrolysates are widely distributed in foodstuffs. The rate of browning of solutions of glucose-glycine peptides was well described by a mixed order kinetic model-having two rate coeff. K and K.´The peptides used in the present study were simple compared with others and the results obtained here cannot be generalised but they might be of considerable interest to predict the behaviour of peptides when they are used in food formulations. NGKR

2717 Del Pilar Buera (M), Chirife (J), Resnik (SL) and Lozano (RD). Nonenzymatic browning in liquid model systems of high water activity: Kinetics of colour changes due to caramelization of various single sugars. Journal of Food Science 52(4); 1987; 1059-1062, 1073

This study concerns colour changes due to caramelization of various single sugar solutions having water activity adjusted to 0.90 with sodium chloride and heated to temp. corresponding to accelerated storage conditions. It was seen that activation energies for colour development of fructose and xylose were in the range of 25-30 kcal/mole, while for lactose and maltose they were 35-48 kcal/mole. Lowering of pH inhibited caramelization browning of sugar solution. The role of hydrolysis in the browning of heated sucrose solutions was studied. NGKR

2718 Del Pilar Buera (M), Chirife (J), Resnik (SL) and Wetzler (G). Nonenzymatic browning in liquid model systems of high water activity: Kinetics of colour changes due to Maillard's reaction between different single sugars and glycine and comparison with caramelization browning. Journal of Food Science 52(4); 1987; 1063-1067

This study concerns colour changes due to reaction between the same single sugars and the amino acid glycine and estimation of the relative roles of caramelization and Maillard's browning. The results showed that the behaviour of fructose glycine solutions was well described by a zero-order reaction model but for the other sugars a fractional order kinetic model was necessary. The role of hydrolysis of sucrose as related to Maillard's browning of heated sucrose glycine solutions was also studied. Caramelization browning seemed to contribute noticeably to total colour development only in fructose-glycine solutions. NGKR

BAKERY PRODUCTS

Bread

2719 Lamkin (WM), Unruh (NC) and Pomeranz (Y). Gas chromatographic determination of calcium propionate added as preservative to bread. **Journal of the Association of Official Analytical Chemists** 70(4); 1987; 763-767

A simple and rapid method was developed for determining low concn. of propionate added to bread. The bread was ground and fruity divided by a No. 8 sieve and propionate was extracted into 0.050M formic acid in a low speed blender for 5 min, and the aliquot analysed by gas chromatography. MVG

2720 Pritchard (PE). Technical note: A small-scale yeasted dough expansion test for the evaluation of breadmaking flours and other bakery ingredients. **International Journal of Food Science and Technology** 22(3); 1987; 309-313

2721 Qarooni (J), Orth (RA) and Wootton (M). A test baking technique for Arabic bread quality. **Journal of Cereal Science** 6(1); 1987; 69-80

A test and scoring method for Arabic breads to study Australian wheats and to improve on aspects of previous work in test baking of Arabic bread has been described in this paper. It was found that proportion of water required to produce consistency of 85 (BU on the Farinograph was judged the best. Sheeting thickness and dough mixing times are also similarly standardised and using this method it is found possible to discriminate flour samples and is a comprehensive and commercially relevant bread scoring method. NGKR

MILK AND DAIRY PRODUCTS

2722 Gupta (SK), Agrawala (SP), Patel (AA) and Sawhney (AK). Development of equipments for indigenous dairy products. **Indian Dairyman** 39(9); 1987; 419-425

Progress made so far in developing equipment for indigenous dairy product preparation like **khoa**, **Gulab jamun**, ghee, channa **Paneer** and **Shrikhand**, have been discussed. The equipment for **khoa** making which is dealt in detail includes aspects like traditional method, continuous **khoa** making machine, mechanized **khoa** pan for rural application, conical process vat, scraped surface heat exchangers, and membrane process for **khoa** making. KMD

2723 Hansen (AP). Effect of ultra-high-temperature processing and storage on dairy food flavour. **Food Technology** 41(9); 1987; 112-116

This study reports the effect of UHT processing and storage on the natural flavours in milk and cream, and to monitor aroma changes in headspace during storage. Also considered is difference in flavour profiles of various flavoureo commercial UHT milks. BV

Milk

2724 Arora (KL). Quality of sweetened condensed milk manufactured in India. **Indian Dairyman 39(9); 1987; 415-417**

Chemical and microbiological quality of some brands of condensed milk manufactured in India were studied. A total of 40 samples of 3 brands were studied for chemical quality and 110 samples of 5 brands were studied for microbiological quality. Chemical analysis revealed wide variations in fat, total solids, milk solids and sucrose. The samples of Brand A had lower total solids (74.23%), milk solids (29.96%) and sugar (42.67%), but higher fat (8.84%) content than Brand B for which the corresponding figures were 76.13, 31.87, 44.21 and 8.78%. On the other hand the samples of Brand C had higher total solids (75.95%), milk solids (34.40%) and fat (9.34%) content and lower sugar (41.45%) and acidity than Brands A and B. The microbiological quality which was investigated in 5 brands varied significantly. Brands A and B had extremely high total viable counts ranging from 70.-231000/g to 60-54000/g resp. In these two brands yeasts and molds were also high with an average of 50 and 102/g while coliform counts of Brand A was high and Brand D within acceptable limits. The overall microbiological quality of brands C, D and E were found very good and was within acceptable limits. KMD

2725 Arora (KL) and Bhatia (KL). Advances in analytical techniques for chemical evaluation of milk and milk products. **Indian Dairyman 39(7); 1987; 335-340**

Various tests have been developed for chemical quality evaluation of milk and milk products some of which have been modified from time to time to cope up with the rapidity required to process milk and its products. In this review, the tests, for evaluating chemical quality of milk products, with respect to fat, proteins, carbohydrates, total solids and complete analysis are discussed. KMD

2726 Berankova (E), Rauch (P), Kas (J), Husek (V) and Paluska (E). Indirect assay of milk clotting activity of Mucor miehei proteinase (fromase) in combined rennets. **Journal of Dairy Research 54(3); 1987; 407-412**

The new method proposed consists of detn. of milk clotting activity in combined rennets as the difference between the total activity of the combined rennets and the residual activity after inhibition of fromase by the purified immounoglobin fraction of fromase antiserum. MVG

2727 Dabeka (RW) and McKenzie (AD). Lead, cadmium and fluoride levels in market milk and infant formulas in Canada. **Journal of the Association of Official Analytical Chemists 70(4); 1987; 754-757**

The paper discusses survey to define accurate elements of dietary intake by using sensitive methodology and to compare the levels of elements in infant formulas and milk to establish the presence or absence of contamination during processing or packaging. MVG

2728 Goyal (GK). Testing of plastic films used for the packaging of pasteurized milk. **Indian Dairyman 39(7); 1987; 323-325**

The study reveals that low density polythene (LDPE) is the most popular packaging material used for packaging of pasteurised milk. The milk packaging material should preserve the initial quality of milk for a predetermined length of time. It should not cause bacterial contamination, impart smell and taste to milk, besides resistant to UV light and should have no physiological effects. The material should also have necessary physico-chemical and mechanical properties. KMD

2729 Grover (S), Batish (VK) and Yadav (JS). Preservation of milk by irradiation. Part I. Ionizing radiations. **Indian Dairyman** 39(7); 1987; 331-334

Article covers aspects like prerequisites for successful operation of irradiation for milk preservation; factors affecting resistance of microorganisms to radiations; types of radiation processing and effect of radiation on milk constituents. KMD

2730 Mittal (SB) and Nguyen (MH). Cleaning and sanitizing in the milk processing industry. **Indian Dairyman** 39(9); 1987; 447-452

The paper reviews water as a factor in cleaning; various detergents used in cleaning, role of sanitizers/disinfectants; cleaning methods and hygienic construction of equipment; quality control; various unsolved problems in the sphere of cleaning and sanitation; and the current cleaning practice. KMD

2731 Ray (HP). Inadequacy of current microbiological parameters in relation to safety of milk and milk products. **Indian Dairyman** 39(9); 1987; 439-442

A general article dealing with the limitation in the present methods adopted for the enumeration of pathogenic and toxic organism in milk; the recent advancement made for assessing the microbiological quality of milk, rapid methods for screening milk on the platform, low temp. microbiology and long distance rail transport of milk and methods for quick enumeration of psychrotrophs. KMD

2732 Scurlock (PG). Whipping of creams from ultrafiltered milk. **Journal of Dairy Research** 54(3); 1987; 421-428

Effect of additional proteins on the whipping properties is described. If the fat content of whipping cream could be lowered by incorporating extra protein, and still produces a satisfactory whipped product, the yield would be increased. MVG

2733 Shelley (AW), Deeth (HC) and MacRae (IC). Comparison of a simple butterfat agar medium with other media used for isolation and enumeration of lipolytic bacteria from dairy products. **Journal of Dairy Research** 54(3); 1987; 413-420

A nutrient agar medium containing 0.1% of a low melting point fraction of butterfat has been developed. It was shown to be suitable for detection, enumeration and isolation of lipolytic bacteria from milk. As butterfat does not inhibit bacterial growth, the lypolytic fractions were clearly visible and easily interpreted. The agar gave comparable results from those obtained from other commonly used media. MVG

2734 Sunita Grover), Batish (VK) and Yadav (JS). Rapid detection of residual antibiotics in milk. **Indian Dairyman** 39(8); 1987; 393-397

Tests based on acid production, reduction of dyes, plating procedure, Delvo test and more recent methods based on immunology, and penzyme test have been covered. KAR

Goats milk

2735 Mikkelsen (J), Hojrup (P) and Knudsen (J). Purification of goats' milk casein by reversed-phase high-performance liquid chromatography and identification of Alpha **Journal of Dairy Research** 54(3); 1987; 361-367

Goat's milk caseins were separated into four components and their purity was checked by gel electrophoretic, amino acid analysis and N-terminal residues. By a comparison with previous results, the four peaks were identified as K, Alpha$_{s1}$, Alpha$_{s2}$ and Beta-casein. Presence of Alpha-casein was confirmed by sequencing it into 44 steps which revealed it was identical to bovine Alpha-$_{1}$ -casein and the previously reported N-terminal sequence. MVG

Milk products

2736 Phillips (LG), Haque (Z) and Kinsella (JE). A method for the measurement of foam formation and stability. **Journal of.Food Science** 52(4); 1987; 1074-1077

A whipping method by which the characteristic foams formed by the following proteins can be studied was developed. This method was able to detect differences between foams produced by sodium caseinate, milk protein isolate and whey protein. The effects of copper sulphate and protease on peptone on egg white foams were studied to show the relability of the method. The experiments in this study demonstrated the capacity of this simple method to detect differences between proteins and the effects of extrinsic substances on the foaming properties of the proteins. NGKR

Cheese

2737 Qvist (KB), Thomsen (D) and Hoier (E). Effect of ultrafiltered milk and use of different starters on the manufacture, fermentation and ripening of Havarti cheese. **Journal of Dairy Research** 54(3); 1987; 437-446

The effect of starter cultures on the fermentation and ripening of Havarti cheese made by ultrafiltration method are discussed. MVG

Khoa

2738 Dharam Pal) and Munir cheryan. Application of reverse osmosis in the manufacture of khoa. Process optimisation and product quality. **Journal of Food Science and Technology, India** 24(5); 1987; 233-238

A process has been developed for the manufacture of **khoa** using reverse osmosis (RO) to preconcentrate the milk. Flux in spiral-wound cellulose acetate membranes was pressure-dependent up to 27 kg/cm and then became independent of pressure. No permeation was observed until a pressure of 6 kg/cm was applied due to the osmotic pressure of milk. Flow rate affected flux only in the pressure-independent region. The average flux when concentrating cow's milk from 12.5% total solids to 31% total solids was 8.10 l/square meter/h at 30 C. **Khoa** manufactured from pre-concentrated (31% total solids) whole milk was typical in flavour and texture compared to **khoa** made in the traditional open-pan boiler. The mineral and ash contents of RO-**khoa** were slightly lower due to permeation of these compounds through the RO membrane. The overall economics and feasibility of a continuous **khoa** manufacturing operation based on reverse osmosis is attractive primarily because of the large savings in energy compared to traditional ers. MVG

Milk powders

2739 Egmond (HP) and Wagstaffe (PJ). Development of milk powder reference materials certified for aflatoxin M content. Part I. **Journal of the Association of Official Analytical Chemists** 70(4); 1987; 605-610

2740 Sudhakar (G), Ravindranath (M) and Chalapathi (GV). Economic and improved packing system for milk powder. **Indian Dairyman** 39(9); 1987; 443-445

An economic, elegant, durable, light wt. and mostly acceptable bag for milk powder packing has been designed. HDPE fabric of 12 x 12 mesh, 800 daniers, laminated with 80 gsm sack kraft using LD co-extrusion process is made with a bag by fusing the sides and stitching the bottom with 2 line chain stitch covering with 55 mm crepe paper border. The size of the bag is 54.5 cm x 95 cm. The milk powder is filled into a secondary bag made up of LDPE 300 or 100 guage cross laminated film or multilayer coextrusion film 50 µ to protect from moisture vapour ingress and physical stresses. The secondary bag is sealed and inserted in the primary bag and closed. The total system takes care of any kind of mechanical stresses, water proofing during storage, handling and transportation. This bag is 15-20% cheaper than the conventional laminated jute bag. KMD

Oggtt

2741 Al-Ruqaie (IM), El-Nakhal (HM) and Wahdan (AN). Improvement in the quality of the dried fermented milk product, Oggtt. **Journal of Dairy Research** 54(3); 1987; 429-435

Oggtt is a dried fermented milk product made and marketed primitively under uncontrolled conditions in the Arabian peninsula. By applying controlled conditions for production, the keeping quality of **oggtt** was greatly improved. The two types (cooked and salted) were produced from fresh pasteurized goats' or cows' milk or from skim milk powder. **Oggtts** flavoured with chocolate, date, mint or different fruits were also produced. Chemical composition and organoleptic properties of the final products were evaluated. Taste panel results indicated that the plain products, including those made from reconstituted milk, were acceptable, but flavoured **oggtts**, with the exception of date flavour, were not popular. AS

Paneer

2742 Kulshreshtha (M), Agrawal (US) and Singh (BPN). Study of **paneer** quality in relation to processing conditions. **Journal of Food Science and Technology, India** 24(5); 1987; 239-242

A laboratory model press was used to correlate final **paneer** (Indian cheese) to pressing conditions. Moisture content, shear strength and porosity were considered and the effect of pressure and time of pressing on these quality factors was studied. Final moisture content and shear strength as a function of pressure were predicted by developing mathematical models. Pressure conditions had no significant effect on porosity even at 10% level of significance. Pressing at lower pressures around 1 kg/cm^2 gave uniform quality product. MVG

Shrikhand

2743 Atreja (SK) and Deodhar (AD). Nutrient status during **Shrikhand** making. **Journal of Food Science and Technology, India** 24(5); 1987; 266-267

Changes in certain nutrients during **Shrikhand** making using fresh buffalo milk with two different cultures YH (**Streptococcus thermophilus and Lactobacillus bulgaricus** 1:1) and LF-40 (Lactic **fermentii** consisting of different strains of **S. lactis**) were studied. There was an increase in the contents of vitamin B2 (121-131%), folic acid (165-331%) and niacin (160-201%) at the stage of **dahi** (curd) making. Protein and methionine contents were unaltered. During **chakka** making there were substantial losses of all three vitamins in whey. The product made with YH culture was superior in nutrients compared to that made with LF-40 culture. MVG

Whey

2744 Ennis (BM) and Maddox (IS). The effect of pH and lactose concentration on solvent production from whey permeate using **Clostridium acetobutylicum**. **Biotechnology and Bioengineering** 29(3); 1987; 329-334

A study was performed to optimize the production of solvents from whey permeate in batch fermentation using **Clostridium acetobutylicum** P262. Fermentations performed at relatively low pH values resulted in high solvent yields and productivities, but lactose utilization was incomplete. At high pH values, lactose utilization was improved but acid production dominated over solvent production. When operating at the higher pH values, an increase in the initial lactose concn. of the whey permeate resulted in lower rates of lactose utilization, and this was accompanied by increased solvent production and decreased acid production. Analysis of data from several experiments revealed a strong inverse relationship between solvent yield and lactose utilization rate. Thus, conditions which minimize the lactose utilization rate, such as low culture pH values or high initial lactose concn., favour solventogenesis at the expense of acid production. AS

2745 Liao (SY) and Mangino (ME). Characterization of the composition, physicochemical and functional properties of acid whey protein concentrates. **Journal of Food Science** 52(4); 1987; 1033-1037

This study was undertaken to examine a number of commercially available acid whey protein conc. (WPC) produced under similar conditions to determine the factors important to WPC functionality by relating variations in composition and physical properties to variations in foaming and emulsifying properties. The objective was to develop models to relate the important WPC characteristics to product functionality. This study showed that considerable variation in the physicochemical properties of WPCs is possible during processing. To decrease the variability in WPC functionality it will be important to identify these steps during processing which have the greatest effects on protein hydrophobicity, solubility and disulphide content. NGKR

2746 Mulvihill (DM) and Kinsella (JE). Gelation characteristics of whey proteins and Beta-lactoglobulin. **Food Technology** 41(9); 1987; 102-111

Reviews the mechanism of protein gelation and the effects of various intrinsic and environmental factors on whole whey protein and Beta-lactoglobulin gelation. 46 references. BV

2747 Tahoun (MK), El-Merheb (Z), Salam (A) and Youssef (A). Biomass and lipids from lactose or whey by **Trichosporon beigelii**. **Biotechnology and Bioengineering** 29(3); 1987; 358-360

The yeast **Trichosporon beigelii** produced the highest amount of biomass when grown in chemical-defined medium with a ratio of carbon source to nitrogen source of 30:1. On the other hand, carbon-limited medium (C-N ratio 2:1) enhanced unsaturated fatty acids synthesis. The yeast efficiently converted unsalted whey lactose to biomass, while sodium chloride in whey raised lactose assimilation to single-cell oil (SCO). AS

Yoghurt

2748 Cluzel (P-J), Veaux (M), Rousseau (M) and Accolas (J-P). Evidence for temperature bacteriophages in two strains of **Lactobacillus bulgaricus**. **Journal of Dairy Research** 54(3); 1987; 397-405

Lactobacillus bulgaricus strains LT1 and LT4 were isolated from a yoghurt factory. They were lysogenic and inducible by mitomycin C or UV irradiation induction being optimal at the beginning of exponential growth. Five indicator strains were also found in which the phage lysates propagated well in a liquid medium, but formed plaques on bacterial lawns readily. Phage infection of indicator shown to reach termination needed Ca . Phage particles from each strain exhibited an ultrastructural morphology under the electron microscope, having an isomeric head, a triple collar and a non centractile fibre-containing tail. MVG

Milk proteins

Casein

2749 Bonsing (J) and Mackinlay (AG). Recent studies on nucleotide sequences encoding the caseins. **Journal of Dairy Research** 54(3); 1987; 447-461

2750 Davies (DT) and Law (AJR). Quantitative fractionation of casein mixtures by fast protein liquid chromatography. **Journal of Dairy Research** 54(3); 1987; 369-376

A simple pretreatment procedure of casein mixtures which leads to more effective fractionation by fast protein liquid chromatography (FPLC) is described and the results obtained compared with those obtained from chromatography on DEAE cellulose for Alpha-S_1-, Beta-, d_{s2} and Y_2 and Y_3 -caseins and with those from gel permeation chromatography for K-casein. Quantitatively FPLC values agreed well with the values obtained by other procedures. MVG

2751 Horne (DS). Ethanol stability of casein micelles - a hypothesis concerning the role of calcium phosphate. **Journal of Dairy Research** 54(3); 1987; 389-395

The ethanol (EtOH) stability of skim milk and the stability towards aggregation of casein micelles diluted into ethanolic buffer solutions were compared using data obtained from previously published experiments. Differences in absolute stability and in relative response were observed when Ca^{2+} level and pH were adjusted, the buffer system results lying below those from skim milk in both cases. Increasing the ionic strength of skim milk adjusted to pH 7.0 lowered its EtOH stability whereas increasing the ionic strength of the diluting buffer increased the stability of the casein micelles. The hypothesis is put forward that the differences are due to the simultaneous precipitation of Ca phosphate when EtOH is added to skim milk This draws calcium from the caseinate sites of the micelle, counteracting the destabilizing effects of the EtOH towards the micelle. Suc removal and the consequent restructuring are kinetically controlle and micellar precipitation in skim milk finally occurs when the micellar coagulation time falls within the time scale of the restructurin reactions. AS

2752 Mohammad (KS) and Fox (PF). Heat-induced association-dissociation of casein micelles preceding coagulation. **Journal of Dairy Research** 54(3); 1987; 377-387

Percent total casein sedimented at 10,000 g when milk was heated at 140 C for 1 h and in the relative viscosity. On the other hand, as heating continued both parameters decreased before increasing again just before the onset of visible coagulation. It was suggested that heating milk at high temp. caused an initial aggregation of casein micelles with a concomitant increase in particle size and wt. followed by dissociation of these aggregates with seggregation just after coagulation. This was confirmed by chromatography. In the initial association can play an important role which was also influenced by initial pH and total solids concn. but whey protein had no effect. MVG

MEAT AND POULTRY

Meat

Beef

2753 Takatsuki (K), Suzuki (S), Sato (M), Sakai (K) and Ushizawa (I). Liquid chromatographic determination of free and added niacin and niacinamide in beef and pork. **Journal of the Association of Official Analytical Chemists** 70(4); 1987; 698-702

2754 Takatsuki (K), Suzuki (S), Sato (N) and Ushizawa (I). Gas chromatographic mass spectrometric determination - of erythromycin in beef and pork. **Journal of the Association of Official Analytical Chemists** 70(4); 1987; 708-713

Bovines

2755 Gottesmann (P) and Hamm (R). Development of a method for the detection of bovine diaphragm muscle. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 184(1); 1987; 20-26 (De).

2756 Shears (GE), Ledward (DA) and Neale (RJ). Iron complexation to carboxyl groups in a bovine serum albumin digest. **International Journal of Food Science and Technology** 22(3); 1987; 265-272

The possible complexation occurring between iron and on in vitro protein digest was studied by pH titration and by measuring the concn. of sulphydryl, amino and carboxyl groups in the presence and absence of ferrous and ferric iron. Complexation of iron was shown to occur with the protein digestion products and the carboxy groups were identified as a site of complexation. AS

Pork

2757 Gupta (PK), Chauhan (GS) and Bains (GS). Bacteriological quality of fresh pork collected from different abattoirs and retail shops. **Journal of Food Science and Technology, India** 24(5); 1987; 270-272

Samples of fresh pork were drawn at 15 day intervals from modern, semi modern and rural slaughter houses and 2 retail shops and transferred to laboratory in ice boxes and stored in deep freeze at -18 C until analysed (2-10 h). They were analysed for total bacterial count, standard plate count (SPC), most probable number (MPN) of coliform MPN of E. coli and salmonella incidences. The values for mean SPC, MPN of coliform and E. coli ranged from 5.77 x log 10 to 9.14 x log 10, 4.3 x log 10 to 7.81 x log 10 and 3.5 x log 10 to 7.07 x log 10/g, resp. SPC, coliform and E. coli counts of the samples collected from retail shops were significantly higher than those collected from slaughter houses. Some of the samples were positive for salmonella and serotype isolates were Salmonella bareilly and S. stanley. MVG

Pigs

2758 Warriss (PD), Brown (SN), Francombe (MA) and Higgins (JA). Effect of preslaughter fasting on the characteristics of pig livers. **International Journal of Food Science and Technology** 22(3); 1987; 255-263

Seventy-seven pigs of about 60 kg live wt. were killed in two experiments, which examined the influence of food deprivation preslaughter on the chemical composition, physical characteristics and eating quality of liver. In the first experiment pigs were fasted for 0, 24 or 48 h before slaughter. Livers from fasted animals were lighter in wt. ($P < 0.001$) and contained proportionally slightly more water ($P < 0.001$), fat ($P < 0.001$) and protein ($P < 0.001$) but very much less glycogen ($P < 0.001$) both just after slaughter and during storage at 2 C for up to 72 h. They were darker in colour initially ($P < 0.05$) and after chilling for 72 h ($P < 0.01$) partly due to the higher ($P < 0.05$) concn. of haem pigments. The second experiment examined how these differences influenced eating quality. It included a control group killed 2 h after food withdrawal and groups fasted for 12, 24 and 48 h. After frying, livers from pigs fasted longer were found to be darker in appearnace ($P < 0.001$), less tender ($P < 0.001$), less juicy ($P < 0.001$) and, overall, less acceptable ($P < 0.001$). Livers from pigs fasted longer also lost less wt. during cooking ($P < 0.05$) and were tougher ($P < 0.05$) based on instrumental measurements. Livers from half of the pigs in each fasting group were stored at 2 C prior to assessment of eating quality; the remaining livers were frozen at -20 C. Freezing had small deleterious effects on the texture ($P < 0.01$) and juiciness ($P < 0.05$) of livers but did not influence mean overall acceptability. AS

Poultry

Chickens

Hens

2759 Kondaiah (N) and Panda (B). Physico-chemical and functional properties of spent hen components. **Journal of Food Science and Technology, India** 24(5); 1987; 267-269

Spent hens of Leghorn breed (above 500 days and maintained on deep litter) were fasted for 15 h, slaughtered and hand dressed after scalding for 1 min at 60 C. After evisceration, birds were hot deboned and deboned components namely breast meat, leg meat and wing + back meat, skin, gizzard and heart were separated. They were packed separately in polyethyene bags, frozen for 7 days at -10 C, thawed at 5 C for 15 h, fine minced and analysed. Results showed that breast meat was superior with higher protein, extractable proteins, emulsifying capacity and lower fat and collagen contents for use in further processed or comminuted meat products. Skin contained higher fat and lower protein with max. collagen. Gizzard was slightly preferable to heart and skin was least preferable due to poor functional properties. It was concluded that detn. of optimum level of incorporation of low value components into products needs greater consideration. MVG

Poultry products

Eggs

2760 Prasada Rao (PVV), Seshaiah (K) and Naidu (PR). Determination of malathion residues in eggs by the modified colorimetric method. **Pesticides** 21(8); 1987; 37-38

Malathion residues in eggs can be determined by the modified colorimetric method using bismuth and sodium ethoxide as complexing and hydrolysing reagents respectively. BV

2761 Shepherd (R) and Griffiths (NM). Preferences for eggs produced under different systems assessed by consumer and laboratory panels. **Lebensmittel-Wissenschaft und-Technologie** 20(3); 1987; 128-132

Laboratory and consumer panels assessed liking for yolk colour and overall flavour in eggs from range, litter and cage birds, in both winter and spring. Both panels rated the range eggs as having the deepest volk colour, with litter polar and the cage eggs paler still. Separate-ratings using a Roche fan confirmed · this relationship. For the consumers the yolk colour of the range eggs was very close totheir ideal. The two panels differed in their liking for particular yolk colours. The results for flavour showed the same pattern as for yolk colour, with the strongest flavour for the range eggs followed by litter and cage eggs. This effect was much less marked than for yolk colour and the ratings may have been influenced by the colour of the yolks. AS

Egg products

2762 Bolder (NM), van der Hulst (MC) and Mulder (RWAW). Survival of spoilage and potentially pathogenic microorganisms in egg nog. **Lebensmittel-Wissenschaft und-Technologie** 20(3); 1987; 151-154

Survival of **Bacillus cereus, Lactobacillus** spp., **Salmonellae** and **Staphylococcus aureus** was studied in egg nog containing several concn. of ethanol (upto 21% by volume). It was demonstrated that **Lactobacillus** spp. and **Staphylococcus aureus** didnot survive the preparation treatment. Salmonella strains could not be detected in products containing 17.5% ethanol after storage at 20 C for 4 days. **Bacillus cereus** was able to survive for at least 24 days it products containing 21% ethanol. Egg nog with ethanol contents higher than 10% is considered safe with respect to the survival of potentially pathogenic microorganisms. AS

SEAFOODS

Fish

2763 Hight (SC). Rapid determination of methyl mercury in fish and shellfish: Collaborative study. Journal of the Association of Official Analytical Chemists 70(4); 1987; 667-672

2764 Nose (N), Hoshino (Y), Kikuchi (Y), Horie (M), Saitoh (K) and Nakazawa (H). Simultaneous liquid chromatographic determination of residual synthetic antibacterials in cultured fish. Journal of the Association of Official Analytical Chemists 70(4); 1987; 714-717

A liquid chromatographic method is described to determine simultaneously the 11 synthetic antibacterial agents used in fishery; nitrufuran derivatives of furozolidone, nuforpirinol, difurozone and furamizole; sulfa drugs sulfamerazine, sulfisozole, sulphomonomethoxine and sulfadimethoxine; and oxolinic, nalidixic and piromidic acids. The mobile phase and is a nucleosil C column with tetrahydrofuran-acetonitrile-phosphoric acid-water (29+1+0.06+69.94). Pretreatment of sample with acetone extraction and alumina column clean up gave good separation of LC peaks. Recovery of antibacterial agents was Ca 80%. The lower limit of detection of the drugs was 1-2 kg for 10 uL injection. MVG

2765 Osman (MA), Ashoor (SH) and Marsh (PC). Liquid chromatographic identification of common fish species. Journal of the Association of Official Analytical Chemists 70(4); 1987; 618-625

Simple liquid chromatographic method was used to separate and quantify water soluble sacroplasmic proteins in aqueous blends of each of 31 species of fresh fish. The method proved to be a reliable method to identify all species of fish. The method is rapid with an analysis time of 1 h and it is applicable to fresh and frozen whole, sliced, filleted and minced fish. MVG

2766 Subrata Basu), Das (KP), Chattoraj (DK) and Gopakumar (K). Emulsification efficiency of various extracts of fish, goat and beef proteins in model food emulsions and preparation of sausage. Journal of Food Science and Technology, India 24(5); 1987; 203-207

Emulsifying efficiency of fish, goat and beef protein extracts were measured quantitatively in terms of phase-vol. ratio. The max. phase vol. ratio determined from salt extract, water extract, actomyosin and slurry varied in the order of beef > goat > fish. In presence of mixed fat, extracted from goat fat mixed with peanut oil in varying proportions, the emulsifying capacity was measured. There was slight change in viscosity values for different systems but the max. phase vol. ratio for a particular protein source did not change appreciably with change in composition of mixed fat. Protein stabilised water-in-oil emulsions were less stable than oil-in-water emulsions. The sausages made from all the protein sources were acceptable to taste panel though goat and beef sausages scored better. MVG

Anchovies

2767 Rathnakumar (K). Preliminary studies on biochemical characteristics of Anchovy (Stolephorus indicus). Seafood Export Journal 19(9); 1987; 17-

Two batches of anchovies (**Stolephorus indicus**) analyzed showe the following range of values: average total length, 8 cm; averag standard length, 6.9 cm; average total wt., 3.9 g; moisture, 74.79-77.56%; fat 2.51-4.29%; protein, 17.86-18.56%; ash 2.07-2.46%; volatile base N, 51.01-53.84 mg%, Alpha-amino-N, 84-86.29 mg %; NaCl, 1.03-1.40%. KMD

Shrimps

2768 Godavari Bai (S), Khabade (VS) and Prakash (V). Effect of freezing and sodium citrate treatment on the association-dissociation of proteins from shrimp (**Parapenaeopsis stylifera**). **Journal of Food Science and Technology, India** 24(5); 1987; 243-246

Shrimp samples were washed with municipal water, beheaded, peeled and deveined. One portion of fresh meat was subjected to quick freezing, filled in waxed cartons (400 g capacity) and stored at -20 C. Another portion was dip treated with sodium citrate (8%) for 5 min, drained and stored at -20 C as controls. For protein extraction shrimp (20 g) was homogenised for 2 min with 140 ml of buffer solution consisting 0.02 M sodium carbonate, pH 7.8, containing 5% sodium chloride. The homogenate was centrifuged at 4000 r.p.m. for 45 min at 4 C and supernatant was used for analysis by ultracentrifugation. Results indicate that the proteins dissociate during storage at -20 C. The rate of dissociation in sodium citrate treated shrimp was slower and they had less drip loss with overall quality being better. These results are considered to be due to partial dehydration during storage and the effect of inorganic salts mainly on the non-covalent interactions. MVG

PROTEIN FOODS

Infant foods

2769 Anand (SK) and Singh (RS). Enterotoxigenic **Staphylococcus aureus** in infant foods. **Journal of Food Science and Technology, India** 24(5); 1987; 200-210

One hundred and two samples were procured from different dairy plants and local market comprising of different batches of 10 brands of infant milk food and 3 brands of infant cereal weaning food. The method comprised of spreading appropriate dilutions of samples on prepared plates of Baird-Parker (BP) medium using a hockey bat shaped bent glass rod. A non selective enrichment procedure was followed using Tryptic soy broth to enumerate stressed cells of staphylococci. Suspected colonies from BP medium were picked up and confirmed to be **Staph. aureus** using various biochemical tests. The enterotoxigenicity of **Staph. aureus** was initially checked by coagulase and thermostable deoxyribonulcease (TDNase) production. There was wide variation in staphylococcal incidence with a max. average count of 3.5/g with their presence in 57.8% of the samples. Among staphylococcal isolates, 30% produced enterotoxins, mainly (90.7%) of type B. Toxins A and C were also among those present in combination with B. Single radial immunodiffusion was found less sensitive than rocket immunoelectrophoresis. Other biochemical tests revealed all enterotoxin producers were TDNase positive. However, only 84% of these produced coagulase. None of TDNase negative strains released enterotoxins while coagulase negative strains (7.8%) produced enterotoxins. MVG

2770 Lee (TW). Quantitative determination of linoleic acid in infant formulas by gas chromatography. Journal of the Association of Official **Analytical Chemists** 70(4); 1987; 702-705

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

2771 Luckas (B). A method for the rapid determination of halogenated acetic acids in alcoholic beverages. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 184(1); 1987; 30-32 (De).

A method is described for the rapid detn. of residues of halogenated acetic acids in alcoholic beverages. After extraction with diethyl ether and derivatization with PFBBr and n-butanol/BF_3, the derivatives of the acids are analysed by use of gas chromatography with capillary columns. The detection limits are 0.1 mg/l for chloroacetic acid and 0.01 mg/l for bromo- and iodoacetic acid. AS

Beer

2772 Baxter (ED), Morris (TM) and Picksley (MA). Low proanthocyanidin malts for production of chilled and filtered or fined beer. **Journal of the Institute of Brewing** 93(5); 1987; 387-391

Malts which conform to most commercial specifications can be prepared from Galant barley, which is low in anthocyanogens. However, the malting performance of this var. is only medium and considerable care is required during kilning in order to avoid excessive colour development. Beers brewed from Galant malt have greatly improved chill haze stability, although flavour stability is not significantly affected. Fining and filtration studies on rough beer and forcing tests for the development of non-biological haze in finished beer indicate that the use of Galant malt greatly reduces the extent of precipitation of particulate matter during brewing, conditioning and subsequent storage. This can result in considerable savings in the use of finings, and in longer filter runs since levels of addition of body feed can be reduced. It is suggested that the use of low anthocyanogen malts could, with some beers, reduce the necessity for chilling prior to and during filtration. AS

2773 Knatchbull (FB) and Slaughter (JC). The effect of low carbon dioxide pressures on the absorption of amino acids and production of flavour-active volatiles by yeast. **Journal of the Institute of Brewing** 93(5); 1987; 420-424

Laboratory fermentation of 51 batches of wort under carbon dioxide pressures of 0.5 and 1.0 atm. have shown that whilst the speed of fermentation was affected only slightly, absorption of amino acids, production of several flavour-active compounds and some yeast features were affected. The carbon dioxide pressure led to reduced absorption of Group B amino acids although Group A compounds were unaffected; fusel oil and ester concn. was reduced whereas that of the vicinal diketones and acetaldehyde was increased. Yeast crop and cell viability fell with increase in pressure and at 1.0 atm. the mean cell volume was increased. The results suggest that carbon dioxide could have significant effects on yeast and beer quality within the range of concn. which can be expected to occur in unpressurized commercial fermentations. AS

2774 Rosendal (I) and Schmidt (F). The alcohol table for beer analysis and polynomials for alcohol and extract. **Journal of the Institute of Brewing** 93(5); 1987; 373-377

For the conversion of sp. gr. of distillate to alcohol content in beer analysis the OIML (The International Organisation of Legal Metrology) table in recommended polynomials are given for alcohol and extract. AS

Brewing

2775 Farre (R), Gimeno (MJ) and Lagarda (MJ). The occurrence of chromium in raw materials and its fate in the brewing process. **Journal of the Institute of Brewing** 93(5); 1987; 394-395

The present study describes the contributions of raw material and brewing adjuncts to the chromium content of the final beer. The contribution due to beer in the diet is considered in the light of the recommended daily intake of chromium. BV

2776 Pierce (JS). Horace brown memorial lecture: The role of nitrogen in brewing. **Journal of the Institute of Brewing** 93(5); 1987; 378-381

The development of individual amino acids during malting, their extraction in the brewhouse and assimilation by culture yeasts during fermentation are reviewed as are their effect on the quality of the final beer. The role of nitrogen, barley var., barley nitrogen, malting conditions, grist composition, mashing conditions, biochemistry of malting, fermentation, biochemistry of yeast fermentations and high mol. N are also covered. 18 references. BV

Hops

2777 Halsey (SA). Near infrared reflectance analysis of whole hop cones. **Journal of the Institute of Brewing** 93(5); 1987; 399-404

Near infrared (NIR) reflectance spectroscopy has been evaluated for the analysis of whole hops from the 1985 and 1986 U.K. crops. Good agreement, with a correlation coeff. (r) of 0.963, was obtained between reference and NIR methods for moisture measurement. A standard error of prediction (SEP) between 0.27-0.33% was achieved over the two years. Good correlations, up to 0.949 between methods, were achieved for Lead Conductance Value (SEP 0.73%). While this accuracy is not acceptable for commercial transactions the measurement could be useful for screening purposes, for example, plant breeding or monitoring of crop ripening. Similar calibrations have been achieved for Alpha-acids (r 0.940, SEP 0.74%) and Beta-acids (r 0.910, SEP 0.43%). A less accurate calibration has been developed for hop oil analysis (r 0.803, SEP 0.17 ml/100 g). Since no sample preparation is required, the NIR technique provides a rapid and non-destructive method for measuring all these constituents simultaneously. AS

2778 Simpson (WJ). Synergism between hop resins and phosphoric acid and its relevance to the acid washing of yeast. **Journal of the Institute of Brewing** 93(5); 1987; 405-406

Hop resins present in brewery yeast slurries have a bactericidal action on lactic acid bacteria during the acid washing process. AS

Malt

2779 Gill (AA) and Haslemore (RM). A comparison of two methods for the estimation of Beta-glucanase activity in malt. **Journal of the Institute of Brewing** 93(5); 1987; 392-393

A new method for estimating malt Beta-glucanase activity, based on a chemically modified, azo dye-labelled barley Beta-glucan substrate, has been compared with a viscometric procedure. The azo-barley glucan method was found to be simple to perform, to give excellent precision with good reproducibility between laboratories and to have a high correlation (r = 0.903***) with the slower viscometric procedure currently used by the industry. AS

2780 Halsey (SA). Rapid analysis of whole malt using near infrared reflectance spectroscopy. **Journal of the Institute of Brewing** 93(5); 1987; 407-412

Near infrared (NIR) reflectance spectroscopy has been evaluated for the analysis of whole malt. Good agreement has been obtained between NIR and reference methods for moisture and total nitrogen. A correlation coeff. (r) of 0.974 and a standard error of prediction (SEP) of 0.13% was obtained for the moisture measurement. Similarly the correlation between methods for total nitrogen analysis was 0.964 with a SEP of 0.049%. In addition, NIR spectroscopy can be used to predict wort composition from scans on whole malt, without the need for mashing. Hot Water Extract (r 0.951, SEP 2.1 1 /kg), total carbohydrates (r 0.946, SEP 0.07%), fermentable sugars (r 0.903, SEP 0.11%), total soluble nitrogen (r 0.900, SEP 0.027%). Free amino nitrogen (r 0.857, SEP 1.0 mg/100 ml) and fermentability (r 0.884, SEP 0.90%) can be measured using this technique. Since no sample preparation is required, NIR spectroscopy provides a rapid method for simultaneous measurement of all these parameters in under two min. AS

2781 Skerritt (JH), Hayes (G) and Henry (RJ). A simple and rapid test for assessment of endosperm protein modification during malting. **Journal of the Institute of Brewing** 93(5); 1987; 413-419

A simple test has been developed for the quantitation of endosperm protein modification in malts. Barley meals or ground malts were extracted with a suitable solvent and the clarified hordein extract diluted into an appropriate precipitant. Of a var. of extractants and precipitants investigated, 1M urea-1% (v/v) mercaptoethanol and 1M sodium chloride were resp. found to be most suitable. Under those conditions a turbid suspension forms; the turbidity of extracts decreased progressively during malting. Turbidity was due to selective precipitation of a specific group of "B" hordeins. In an analysis of nine var. differing in malting qualities, a significant correlation between the reduction in extracts turbidity and cell wall modification (Calcoflour staining) was observed at 48 h malting. In addition, for each var. examined, protein modification occurred about one day before carbohydrate modification. Analysis of commercial malts and several samples of selected cv. from regional trials found good correlations between malt turbidities and per cent malt extract and Kolbach index. The test is rapid (10-90 min.) and can be used to screen large numbers of samples; since it is simpler than alpha-amino nitrogen or Kolbach index detn., it may be of use in analysis of malts for protein modification. AS

Spirits

2782 Aylott (RI), McNeish (AS) and Walker (DA). Determination of ethyl carbamate in distilled spirits using nitrogen specific and mass spectrometric detection. **Journal of the Institute of Brewing** 93(5); 1987; 382-386

Gas chromatographic methods are described for the detn. of naturally occurring ethyl carbamate in distilled spirits at levels as low as 5 p.p.m. Bottled products, such as whisky, gin and brandy, are extracted in the presence of n-propyl carbamate as internal standard and analysed by capillary column gas chromatography with either nitrogen specific or mass spectrometric detection. A shorter extraction procedure is satisfactory when the more sensitive and selective mass spectrometric detection is used. Direct sample injection without extraction may be used for higher alcoholic strength cask and new-make samples. Analysis of 181 blended Scotch whisky samples indicated ethyl carbamate concn. ranging from 20 to 75 p.p.b. Concn. in 48 malt whiskies ranged from 15-100 p.p.b. Ethyl carbamate was not detected in gin, vodka and rectified neutral alcohol. All concn. in bottled product fell below the Canadian limit of 150 p.p.b. in distilled spirits. AS

Non-alcoholic beverages

Coffee

2783 Hughes (WJ) and Thorpe (TM). Determination of organic acids and sucrose in roasted coffee by capillary gas chromatography. **Journal of Food Science** 52(4); 1987; 1078-1083

Capillary gas chromatography was used to obtain high resolution profiles of 27 organic acids, caffeine and sucrose in dimethyl sulphoxide extracts of roast and ground coffee in a 60 min. analysis. All of these are reported to influence coffee flavour directly or to be precursors for production of flavourful compounds. Major commercial brands of caffeinated and decaffeinated coffee produced under different roasting conditions could be distinguished based on their 5 CQA and sucrose content and on the ratio of AQ to 5 CQA. NGKR

Fruit juices

2784 Pifferi (PG) and Preziuso (M). Immobilization of endo-polygalacturonase on Gamma-alumina for the treatment of fruit juices. **Lebensmittel-Wissenschaft und-Technologie** 20(3); 1987; 137-142

Gamma-Alumina presents the best endo-PG adsorption yields from **Aspergillus niger**, above 92% with 12-16,000 AU/g. Endo-PG, immobilized on Gamma-alumina-HMDA-Ga at 25 C and pH 3.0, has a much higher half-life than on Gamma-alumina-Ti-HMDAS-Ga-Endo-PG-HMDA-Ga at 25 and 40 C and pH 3.0 shows almost double the stability of the soluble enzyme: at pH 4.0 it shows equal stability, and at pH 5.0-6.0 greatly reduced stability. These results support the use of immobilized endo-PG on Gamma-alumina-HMDA-Ga for clarification of fruit juices at 25 C and a pH of about 3.0. AS

Citrus juices

2785 Fellers (PJ) and Barron (RW). A commercial method for recovery of natural pigment granules from citrus juices for colour enhancement purposes. **Journal of Food Science** 52(4); 1987; 994-995, 1005

This study was made to investigate the feasibility of recovering pigment granules by differential centrifugation of pasteurised Daney tangerine and murcott juices utilising commercial machinery in a continuous operation, utilises the recovered granules for natural colour enhancement of poorly coloured citrus juices and determine the effect of the added granules on juice flavour. Results showed that by using different centrifugation natural highly coloured orange pigment granules were recovered from the juices of single lots of Florida Dancy tangerines harvested in each of 4 years and orange/red pigment granules from two lots of murcotts harvested during a single year. Colour was significantly enhanced in poorly coloured commercial orange juices through addition of relatively small amounts of pigment granules recovered from the juices. NGKR

Tomato juices

2786 Bhasin (UR) and Bains (GS). Study of pectolytic factors and processing in relation to rheological characteristics of tomato juice. **Journal of Food Science and Technology, India** 24(5); 1987; 247-253

Integrated effects of pectolytic changes in relation to rheological characteristics of cold vs. hot break tomato juice were studied in two most cultivated var. namely Punjab Chhuhara and Punjab Kesri. A relationship was observed between high viscosity of hot break tomato juice and its high pectin content and nature of pectin. The predominant fraction of the juice was water soluble pectin. More of the higher mol. wt. fraction was retained in the hot break juice than in controls as indicated by gel filtration studies. The methoxyl content of serum pectin in hot break juice was higher than in cold break. Other factors discussed are the differences in electrophoretic pattern of cold vs. hot break juice, and the effect of long term storage on the elution profile and electrophoretic mobility. MVG

Wines

2787 Estrella (I), Alonso (E) and Revilla (E). Presence of flavonol aglycones in sherry wines and changes in their content during aging. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 184(1); 1987; 27-29

The presence of free flavonol aglycones in three types of Sherry wines (Fino, Oloroso, and Amontillado) and the changes in their contents during ageing in eight Solera systems were studied. The samples of Fino wines present a small amount of quercetin and also very small quantities of kaempferol and isorhamnetin, and the contents of these compounds appear to decrease during ageing. On the other hand, these flavonols are absent in Oloroso and Amontillado wines. Such differences may have been due to the different processes that are involved in the ageing of these wines. AS

FATS AND OILS

Fats

2788 Balazs (IL). Refining and use of byproducts from various fats and oils. **Journal of the American Oil Chemists" Society** 64(8); 1987; 1126-1128

This review discusses the refining and use of by products from various fats and oils. This covers refining methods soapstock acidulation, acid oil use and general picture of the major byproducts generated by the most common refining methods for crude fats and oils and methods available to refiners to handle their byproducts. NGKR

Oils

2789 Jayasree (N) and Indrasenan (P). Titrimetric determination of iodine-bromine numbers of some edible oils using three N-chloroimides. **Journal of the Association of Official Analytical Chemists** 70(4); 1987; 762-763

Three simple titrimetric methods have been developed to determine iodine-bromine numbers of some edible oils, such as coconut, gingelly, groundnut, mustard, olive, palm olein, and sunflower, using 3 N-chloroimides. The 3 N-chloroimides are N-chlorophthalimide, N-chlorosuccinimide, and N-chlorosaccharin, all of which have recently been developed as potential oxidimetric titrants for use in aqueous acetic acid medium. The proposed excess back-titration methods have advantages over existing methods in terms of ease of extraction into aqueous acetic acid layer, shorter reaction time of NCSA method, and stability of N-chloroimides in solid state. AS

Cottonseed oils

2790 Kiosseoglou (B) and Boskou (D). On the level of esterified sterols in cottonseed, tomato seed, wheat germ and safflower oils. **Oleagineux** 42(4); 1987; 169-170

Sterols present in the ester form in cottonseed, tomato seed, wheat germ and safflowr oils were separated from the free sterols and assayed gas chromatographically. The steryl ester fraction was obtained by combined column chromatography-thin layer chromatography. With the exception of cottronseed oil, the steryl esters accounted for more than one third of the total sterol fraction. In wheat germ oil the major part of sterols was present in the esterified form. Unusually high values of cholesterol (up to 41%) were found in the ester fraction of tomato seed oil. AS

Essential oils

Orange peel oils

2791 Hadj-Mahammed (M) and Meklati (BY). Qualitative determination of polymethoxylated flavones in Valencia orange peel oil and juice by LC-UV/VIS and LC-MS techniques. **Lebensmittel-Wissenschaft und-Technologie** 20(3); 1987; 111-114

Polymethoxylated flavones were rapidly identified in the juice and in the peel oil of Algerian Valencia oranges by means of LC-UV/VIS and LC-MS techniques. BV

Palm oils

2792 Van Putte (KPAM) and Bakker (BH). Crystallization kinetics of palm oil. **Journal of the American Oil Chemists" Society** 64(8); 1987; 1138-1143

The quality and yield of oils obtained by fractionation processes mainly depends on the separation efficiency of fat crystals from the mother liquor. Palm oil was chosen as a model system for the crystallization work concerning the fractionation work. These studies showed that the kinetics of these crystallization of fats and oils can be described by equations commonly used for inorganic experimental systems. NGKR

Soybean oils

2793 Engeseth (NJ), Klein (BP) and Warner (K). Lipoxygenase isoenzyme in soybeans: Effects of crude oil quality. **Journal of Food Science** 52(4); 1987; 1015-1019, 1029

This study was to determine how different tempering procedures influenced lipoxygenase activity and the sensory quality of crude soybean oil. The results indicated that the quality of soybean oil was not significantly improved by using soybeans that were low in the major isoenzyme of lipoxygenase. Tempering procedures had more impact than cv. on crude oil quality, peroxide values of stored oils were significantly higher than those of oils that were not stored. Roasted and grassy flavours were more predominant in oils from tempered than untempered soybeans. NGKR

2794 Perkins (EG) and Smick (C). Octadecatrienoic fatty acid isomers of partially hydrogenated soybean oils. **Journal of the American Oil Chemists" Society** 64(8); 1987; 1150-1155

The content and types of trienoic acids present in a repesentative sample of partially hydrogenated soybean oil were concentrated, isolated and analysed. This (PH SBO) is typical of that produced for use as both a salad and a cooking oil. The results showed that the 18:3 acids present in (PH SBO) onsisted of 4 isomers the largest amount (2-7%) being cis isomer C9, C12, C15-18:3 linolenic acid and constituted 68.6% of all the isomeric 18:3 acids of PH SBO. The remaining three 18:3 isomers found were t9, t12, C15-t9, C12, C15- and C9, C12, t15-18:3 which in total accounted, for 1.2% of the total fatty acids of PH SBO. NGKR

2795 Proctor (A) and Snyder (HE). Adsorption of lutein from soybean oil on silicic acid I. Isotherms. **Journal of the American Oil Chemists" Society** 64(8); 1987; 1163-1166

The results of experiments on adsorption of lutein from soybean oil on silicic acid showed that in the presence of triglyceride the lutein adsorption was different than with purified lutein. Further investigation of the lutein adsorption showed that additon of 1% isopropanol to the hexane solvent and deactivation of the silica acid with water decreased lutein adsorption and lutein adsorption was not due to partitioning between bound triglyceride and hexane solvent. NGKR

SPICES AND CONDIMENTS

Condiments

Pickles

2796 Khatchadourian (HA), Sawaya (WN), Ayaz (M) and Al-Mohammad (MM). Processing date varieties into pickles. **International Journal of Food Science and Technology** 22(3); 1987; 243-247

Three major Saudi Arabian dates (**Phoenix dactylifera**) var. (**Nabbut Ghrein**, Miskani and Halwa) were processed into pickles. Titratable acidity, pH, total soluble solids, sucrose and reducing sugars were measured. All var. processed fresh at different acidity levels and heat treatments did not show any significant changes in colour, taste, texture and overall acceptance of the pickles. Pickles prepared from stored data were less acceptable. Kimri (young green dates) stage dates could be used successfully in fresh-pack pickle processing. BV

Spices

Cinnamon

2797 Hicks (CL) and Abdullah (C). Photooxidation of cinnamon oil. **Journal of Food Science** 52(4); 1987; 1041-1046

The studies were undertaken to determine the compounds that were most sensitive to oxidation and to distinguish what major types of mechanisms were involved in cinnamon oxidation. Results showed 37 water soluble compounds in bark distillate using GC/MS procedures and most water soluble bark oil constituents were liable for oxidation by photosensitization. Leaf oil was highly resistant to photooxidation perhaps because eugenol was a major constituent and acted as an antioxidant. Bark oil constituents decreased with storage time when stored in a capped metal container at 22 C for 4 months and the type of deterioration is different from that produced by photooxidation. In addition to cinnamaldehyde 28 compounds have been quantified. NGKR

Paprika

2798 Aquilera (JM), Escobar (GA), Del valle (JM) and San Martin (R). Ethanol extraction of red peppers: Kinetic studies and microstructure. **International Journal of Food Science and Technology** 22(3); 1987; 225-232

A three-parameter kinetic equation was developed for ethanol extraction of oleoresin from dry red peppers under different solute to solvent ratios, particle sizes and condition of structural damage. The model distinguished two main mechanisms of extraction: a fast, washing step and a diffusion-controlled process. Flaking and, to a lesser extent, blanching induced significant cellular damage resulting in more oleoresin being washed, a faster extraction rate and a higher final concn. in the solvent, compared to untreated material. The activation energy for extraction derived from the study was 6.1 kcal/.mol, typical of diffusion-controlled processes. Light micrographs related microstructure to variations in extraction parameters. AS

2799 Reeves (MJ). Re-evaluation of capsicum colour data. **Journal of Food Science** 52(4); 1987; 1047-1049

Paprika (**Capsicum annum**) is one of the oldest and most important source of natural carotenoid colour used in food products such as chili soups stews and sausage like tomatoes, red ripe peppers have basically two pigment colours red and yellow which combine to give a total colour. Although a wide range of pigment levels was found in the peppers tested the variation in pigment content was not the only factor in determining the different pepper colour as expressed by the tristimulus parameters and hence the latter does not provide an accurate means of predicting carotenoid pigment content of peppers. NGKR

Turmeric

2800 Salmen (R), Pedersen (BF) and Malterud (KE). Sudan Red G as an adulterant in turmeric (Curcuma longa L.) **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 184(1); 1987; 33-34

A red substance was isolated from a Tanzanian sample of turmeric (**Curcuma longa** L.) and identified by X-ray single crystal analysis as the azo dye Sudan Red G (1-(2-methoxyphenylazo)-2-naphthol). The concn. of the dye in the spice was 0.09% as calculated from the UV spectrum. AS

SENSORY EVALUATION

Nil

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Pesticides

2801 Rai (RS), Panchi Lal) and Srivastava (PK). Impregnation of jute bags with insecticide for protecting stored foodgrains. III. Comparative efficacy of impregnation method vis-a-vis existing method of prophylactic chemical treatment against cross infestation of different stored grain insect pests. **Pesticides** 21(8); 1987; 39-42

BIOCHEMISTRY AND NUTRITION

Biochemistry

2802 Andersson (AH). Physiological reactions to food. **Var Foda** 39(6); 1987; 280-284 (Sv).

The role of gastric emptying of carbohydrate-rich foods on post-prandial blood sugar and insulin response, the effect of intra-duodenal fat stimulation on the bile salt response and the hypothesis of the effect of diet on brain neurotransmitters are discussed. BV

2803 Atkins (LM), Miner (DJ), Sittampalam (GS) and Wentling (CD). Recommendations for establishment of reference standards for recombinant-DNA-derived proteins and poly peptides. **Journal of the Association of Official Analytical Chemists** 70(4); 1987; 610-617

An integrated approach for the establishment of purified protein and peptide standard reference materials suitable for both biological and chemical assays is described. MVG

2804 Klurfeld (DM), Weber (MM) and Kritchevsky (D). Dietary protein effects on gallstone formation. **Journal of the American Oil Chemists" Society** 64(8); 1987; 1193-1195

This paper describes the work carried out on the effects of altering dietary protein while maintaining other components of the diet. The casein diet for hamsters used as protein source has been substituted with soy protein isolate to reduce serum cholesterol concn. in several species for effects on gall bladder stone formation. The results showed reduced incidence of gallstones. This is attributed to lysine/arginine ratio of the proteins and the reduction in lithogenicity ash been associated with feeding soy protein through decreased secretion of cholesterol into bile. NGKR

2805 Kritchevsky (D), Tepper (SA) and Klurfeld (DM). Dietary protein and atherosclerosis. **Journal of the American Oil Chemists" Society** 64(8); 1987; 1167-1171

This review discusses the various aspects of dietary protein on lipid metabolism and atheroscleoris. This covers the influence of casein or soy protein on a therosclerosis, effect of casein, soy protein hydrolysates or amino acid mixtures. Effect of corn protein, wheat gluten or lactalbumin, or atherosclerosis, influence of beef, casein, textured vegetable protein or beef - TVP, and fish protein casein, and whole milk protein on lipids and atherosclerosis. Also adsorption of cholesterol or oleic acid in rats fed amino acid mixtures, casein, soy protein, casein + arginine or soy protein + lysine. NGKR

2806 Madar (Z) and Thorne (R). Dietary fiber. **Progress in Food and Nutrition Science** 11(2); 1987; 153-174

Covers dietary fibre and lipids metabolism, the effect of dietary fiber on lipoproteins, mechanisms by which dietary fiber modulate nutrient absorption, mechanisms by which dietary fiber regulates lipids and cholesterol metabolism, bile acid sequestering effect of dietary fiber, dietary fiber and carbohydrate metabolism, effect of dietary fiber on glycemic response, mechanism of action by which dietary fiber affects carbohydrates metabolism. Changes in the small intestinel following dietary fiber administration, dietary fiber as a means of pregnancy, diabetes control and possible adverse effects of dietary fiber. 96 references. BV

2807 Nygren (AC). Relations between breakfast habits and blood sugar levels. **Var Foda** 39(6); 1987; 259-265 (Sv).

2808 Thompson (LU) and Gabon (JE). Effect of lectins on salivary and pancreatic amylase activities and the rate of starch digestion. **Journal of Food Science** 52(4),; 1987; 1050-1053, 1058

Digestion of wheat starch (WS) and red kidney bean (RKB) starch by pancreatic (PA) and salivary (SA) amylase in the presence or absence of lectins was determined. Compared with WS, digestion of RKB starch by PA and SA was 70.0% and 66.6% lower, respectively. RKB lectin added to WS at the hemagglutinin activity level in RKB starch resulted in significantly decreased digestion with PA (63.9%) and SA (43.8%) as did heated RKB lectin with insignificant hemagglutinin activity (41.1%) with PA, 35.8% with SA. Jack bean lectin (concanavalin A) also resulted in reduced rate of starch digestibility. Kinetic analyses revealed non competitive inhibition by RKB lectins on both amylases. Results confirmed the role of lectin in reducing the rate of starch digestion and its possible health benefit. AA

2809 Van Der Meer (R) and Beynen (AC). Species-dependent responsiveness of serum cholesterol to dietary proteins. **Journal of the American Oil Chemists" Society** 64(8); 1987; 1172-1177

This review covers possible mechanisms underlying the species-dependent susceptibility to dietary casein in comparison with that to soy protein. Discusses comparative studies using identical diets, possible underlying mechanism, modification of casein effect by cholesterol and fat content of the background diet, speculation on the mode of action of hypercholesterolemic proteins other than casein. NGKR

2810 Zegota (A) and Bachman (S). Nonenzymatic browning induced by gamma-irradiation in model system. Part IV.Three components system consisting of fructose, alanine and phenylalanine. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 184(1); 1987; 3-7

The effect of irradiation on the nonenzymatic browning reaction in the model system consisting of 0.03 M-fructose, 0.01 M-alanine and 0.01 M-phenylalanine in aqueous solution was investigated. The loss of phenylalanine and fructose after irradiation, due to their high reactivity towards radical species of water radiolysis was greater compared with alanine. The heating of preirradiated solution caused only a slight decrease in the concn. of substrates. The chracteristic absorption spectra for only irradiated and for irradiated and heated solutions were recorded. The heating produced a chromophore with a broadened absorption max. about 285 nm. Two unidentified Amadori type compounds which gave positive response to ninhydrin were found by amino acid analysis. AS

TOXICOLOGY

Bacteria

Clostridium botulinum

2811 Smart (JL) and Rush (PAJ). In vitro heat denaturation of **Clostridium botulinum** toxins types A, B and C. **International Journal of Food Science and Technology** 22(3); 1987; 293-298

Under standard condition, the effects of heat on **Clostridium botulinum** toxins types A, B and C were essentially similar. Heat treatments based on existing extensive data for types A and B toxins should be effective against type C toxin for which there is no such information. AS

Clostridium botulinum

2812 Young-Perkins (KE) and Larry Merson (R). **Clostridium botulinum** spore germination, outgrowth, and toxin production below pH 4.6; interactions between pH, total acidity, and buffering capacity. **Journal of Food Science** 52(4); 1987; 1084-1088, 1096

The effect of soy protein concn. on **Clostridium botulinum** spore germination, outgrowth, and toxin production in the presence of varying levels of inorganic (HCl) and organic (citric) acids was investigated. Media were blended using deoxygenated soy conc. (1-7% protein), acidified with deaerated acids to effect post-autoclaving pH values of 4.1, 4.3 and 4.5, and inoculated with **C. botulinum** Type A spores. All manipulations were conducted under conditions of strict anaerobiosis (0-2 p.p.m. atmospheric oxygen, media E values of < -345 mV). Germination, proliferation, active motility, and elaboration of neurotoxin occurred as low as pH 4.07. Titratable acidity, which accounted for the soy protein buffering capacity, appeared to define toxicity endpoints as pH alone could not. AS

Pesticides residues

2813 Daft (J). Determining multifumigants in whole grains and legumes, milled and low-fat grain products, spices, citrus fruit, and beverages. Journal of the Association of Official Analytical Chemists 70(4); 1987; 734-739

2814 Lesser (JH) and Massil (SE). Phase solubility analysis of some organochlorine fungicides. Journal of the Association of Official Analytical Chemists 70(4); 1987; 638-640

Usefulness of phase solubility analysis (PSA) was evaluated for establishing absolute purities of candidate fungicides - chlorothaonil, captan and folpet. Solvent system was chosen such that the solubility of the fungicide was minimal. The data revealed a correlation coefficient better than 0.94. Spiking experiments were also performed. Results of PSA of captan and chlorothaonil were in accord with these obtained by liquid chromatography and differential scanning calorimetry resp. MVG

2815 Luchtefeld (RG). Multiresidue method for determining substituted urea herbicides in foods by liquid chromatography. Journal of the Association of Official Analytical Chemists 70(4); 1987; 740-745

FOOD LAWS AND REGULATIONS

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